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✓NATIONAL AGRICULTURAL RESEARCH
POLICY ACT OF 1976

94-2

P107-30

HEARINGS
BEFORE THE
COMMITTEE ON AGRICULTURE
HOUSE OF REPRESENTATIVES
NINETY-FOURTH CONGRESS
SECOND SESSION
ON
H.R. 11743
FEBRUARY 17 AND 18, 1976

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WASHINGTON : 1976

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NATIONAL AGRICULTURAL RESEARCH POLICY ACT OF 1976

TUESDAY, FEBRUARY 17, 1976

HOUSE OF REPRESENTATIVES,
COMMITTEE ON AGRICULTURE,
Washington, D.C.

The committee met at 10:05 a.m., pursuant to recess, in room 1301, Longworth House Office Building, Hon. Thomas S. Foley (chairman) presiding.

Present: Representatives Foley, Poage, de la Garza, Vigorito, Jones of Tennessee, Brown, Breckinridge, Richmond, Nolan, Baldus, Krebs, Harkin, Hightower, Bedell, McHugh, Jenrette, Wampler, Sebelius, Thone, Symms, Madigan, Jeffords, Kelly, and Grassley.

Also present: Robert M. Bor, counsel; Hyde H. Murray, counsel; John E. Hogan, associate counsel; John R. Kramer, special counsel; Steve Pringle and John Lindley, staff assistants; Gene Moos, staff analyst; L. T. Easley, press assistant; Leighton Lang, staff consultant, Subcommittee on Oilseeds and Rice; Weldon Barton, staff consultant, Subcommittee on Domestic Marketing and Consumer Affairs; James Culver, staff consultant, Subcommittee on Dairy and Poultry; Thomas Adams, staff consultant; Glenda Temple, staff assistant.

The CHAIRMAN. The Committee on Agriculture will come to order. We meet this morning to begin hearings on H.R. 11743, "A Bill to Establish a National Agricultural Research Policy Committee," which was introduced by Mr. Wampler and others.

[The bill, H.R. 11743, follows:]

(1)

94TH CONGRESS
2D SESSION

H. R. 11743

IN THE HOUSE OF REPRESENTATIVES

FEBRUARY 5, 1976

Mr. WAMPLER (for himself, Mr. FOLEY, Mr. DE LA GARZA, Mr. VIGORITO, Mr. JONES of North Carolina, Mr. MELCHER, Mr. BOWEN, Mr. WEAVER, Mr. BALDUS, Mr. McHUGH, Mr. JENNETTE, Mr. THORNTON, Mr. SEBELIUS, Mr. FINDLEY, Mr. THOME, Mr. SYMMS, Mr. JOHNSON of Colorado, Mr. MADIGAN, Mr. PETTER, Mrs. HECKLER of Massachusetts, Mr. JEFFORDS, Mr. KELLY, Mr. GRASSLEY, Mr. HAGEDORN, and Mr. MOORE) introduced the following bill; which was referred to the Committee on Agriculture

A BILL

To establish a National Agricultural Research Policy Committee,
and for other purposes.

1 *Be it enacted by the Senate and House of Representa-*
2 *tives of the United States of America in Congress assembled,*

3 **SHORT TITLE**

4 SECTION 1. This Act may be cited as the "National
5 Agricultural Research Policy Act of 1976".

6 **FINDINGS AND PURPOSES**

7 SEC. 2. (a) The Congress finds that—

8 (1) agricultural research is vital to the Nation's
9 well-being;

I

1 (2) the projected increase in the population of the
2 United States, together with the worldwide population
3 expansion, places increasing demands on agricultural
4 production in the United States;

5 (3) agriculture and agricultural production are a
6 national resource and should be supported by a strong
7 system of agriculturally related research;

8 (4) seeking means and methods to lower the cost
9 of food and fiber production is essential to the preserva-
10 tion of the family farm system in this country;

11 (5) expanding exports of agricultural commodities
12 is essential for maintaining a positive balance of pay-
13 ments in international trade;

14 (6) the public wants the plentiful supplies of qual-
15 ity agricultural products that can bring consumer ex-
16 penditures on food to a lower portion of total income;

17 (7) agricultural research costs have risen more
18 rapidly than appropriations for agricultural research;

19 (8) various factors such as energy, the environ-
20 ment, and social, political, and economic considerations
21 should be incorporated into agricultural research man-
22 agement planning activities;

23 (9) the level of Federal support for agricultural re-
24 search, conducted by the United States Department of

1 Agriculture, State agricultural experiment stations, and
2 State colleges and universities engaged in agricultural
3 research and the training of agricultural research engi-
4 neers and scientists, should be substantially increased;
5 and

6 (10) it is important to assure that the results of
7 agricultural research be effectively communicated to
8 farmers and all others who can benefit from it.

9 (b) The purposes of this Act are—

10 (1) to emphasize agricultural research as a distinct
11 mission of the United States Department of Agriculture;

12 (2) to be certain that all agricultural research is
13 effectively coordinated; and

14 (3) to provide a mechanism for identifying the Na-
15 tion's highest priority problems for agricultural research.

16 COORDINATION OF AGRICULTURAL RESEARCH

17 SEC. 3. (a) In addition to the Assistant Secretaries of
18 Agriculture now provided for by law, there shall be one
19 additional Assistant Secretary of Agriculture, who shall be
20 appointed by the President, by and with the advice and con-
21 sent of the Senate, and who shall be responsible for agricul-
22 tural research activities of the Department of Agriculture.

23 (b) Section 5315(11) of title 5, United States Code,
24 is amended to read as follows:

1 “(11) Assistant Secretaries of Agriculture (5).”

2 (c) The individual appointed pursuant to subsection

3 (a) of this section shall—

4 (1) coordinate all research, and disseminate all
5 research information, relating to agriculture, food pro-
6 duction, and nutrition conducted or financed by or
7 affiliated with the United States Department of
8 Agriculture;

9 (2) keep abreast of developments in, and the
10 Nation’s needs for, agricultural research and represent
11 the needs of such research in deliberations in the United
12 States Department of Agriculture;

13 (3) provide information exchange and coordination
14 among the diverse research programs;

15 (4) serve as co-chairman of the National Agricul-
16 tural Research Policy Committee established pursuant
17 to section 5 of this Act; and

18 (5) perform other duties as determined from time
19 to time by the Secretary of Agriculture.

20 **AGRICULTURAL RESEARCH ADVISER**

21 SEC. 4. (a) The Secretary of Agriculture shall appoint
22 a scientist to serve in the Office of the Secretary and report
23 to the Assistant Secretary of Agriculture who is responsible
24 for agricultural research. Such individual shall receive com-
25 pensation at a level no less than level 16 of the General

1 Schedule and shall be appointed on a noncareer executive
2 assignment basis.

3 (b) The individual appointed pursuant to subsection

4 (a) of this section shall—

5 (1) serve as Executive Secretary of, and provide
6 staff support for, the National Agricultural Research
7 Policy Committee established pursuant to section 5 of
8 this Act;

9 (2) be an adviser to the Assistant Secretary responsible
10 for agricultural research; and

11 (3) perform other duties as determined from time
12 to time by the Assistant Secretary of Agriculture responsible
13 for agricultural research activities of the
14 Department.

15 (c) Such individual shall be provided a staff of specialists
16 to assist him in carrying out his functions. Such staff shall
17 be appointed pursuant to the provisions of title 5, United
18 States Code, governing appointments in the competitive
19 service.

20 ESTABLISHMENT OF NATIONAL AGRICULTURAL RESEARCH

21 POLICY COMMITTEE

22 SEC. 5. (a) There is established within the United
23 States Department of Agriculture a permanent committee to
24 be known as the National Agricultural Research Policy
25 Committee (hereinafter referred to as the "Committee").

1 (b) The Committee shall consist of fifteen members ap-
2 pointed by the Secretary of Agriculture as follows:

3 (1) two representatives from the United States
4 Department of Agriculture, one from the Agricultural
5 Research Service and one from the Cooperative State
6 Research Service;

7 (2) one representative from each of the following
8 organizations upon the recommendation of the head of
9 such organization:

10 (A) the Board of Agriculture and Renewable
11 Resources, National Academy of Sciences;

12 (B) the Experiment Station Committee on
13 Organization and Policy of the National Association
14 of State Universities and Land Grant Colleges,
15 Division of Agriculture;

16 (C) the National Science Foundation;

17 (D) the Office of Technology Assessment of
18 the Congress of the United States;

19 (E) the Environmental Protection Agency;
20 and

21 (F) the Food and Drug Administration,
22 United States Department of Health, Education,
23 and Welfare; and

24 (3) seven representatives from the following types
25 of organizations, as designated by the Secretary, upon

1 the recommendation of the head of the respective
2 organization:

3 (A) two from national farm organizations;

4 (B) two from agricultural trade associations;

5 (C) one from a national environmental or-
6 ganization;

7 (D) one from a national veterinary medical
8 association; and

9 (E) one from a national consumer organization.

10 (c) The Committee's responsibilities shall include, but
11 not be limited to—

12 (1) reviewing programs, policies, and goals of
13 agricultural research agencies of the Department of
14 Agriculture and the agricultural research portions of
15 programs in other agencies having primary missions out-
16 side of such Department;

17 (2) providing a forum for research sponsoring agen-
18 cies to exchange information on plans and programs
19 related to agriculture;

20 (3) establishing and developing national policies,
21 priorities, and strategies for agricultural research for
22 both the short and the long term for consideration by
23 the Department of Agriculture and other agencies, and
24 institutions conducting agricultural research; and

1 (4) reviewing and making recommendations to the
2 Secretary of Agriculture with regard to applications for
3 funding of research pursuant to sections 6 and 7 of this
4 Act.

5 (d) For purposes of this Act, the term "agricultural
6 research" shall include, but not be limited to, those activi-
7 ties described in section 1 of the Act of June 29, 1935 (49
8 Stat 436).

9 (e) While away from their homes or regular places of
10 business in the performance of services for the Committee,
11 members of the Committee shall be allowed travel expenses,
12 including per diem in lieu of subsistence, in accordance with
13 applicable laws.

14 (f) In the event a vacancy should occur on the Com-
15 mittee it shall be filled in the same manner as provided in
16 subsection (b) of this section.

17 (g) No later than January 31 of each year, the Com-
18 mittee shall submit a report on its activities during the
19 preceding fiscal year to the House Committee on Agricul-
20 ture, the House Committee on Appropriations, the Senate
21 Committee on Agriculture and Forestry, and the Senate
22 Committee on Appropriations. The first report shall be due
23 following the first complete fiscal year after the enactment
24 of this Act.

1 GRANTS FOR MISSION-ORIENTED RESEARCH

2 SEC. 6. (a) In addition to any other grants made
3 under Federal law, the Secretary of Agriculture is author-
4 ized to make grants to land grant colleges and universities
5 eligible for assistance under the Acts of July 2, 1862
6 (commonly known as the First Morrill Act), and of
7 August 30, 1890 (commonly known as the Second Morrill
8 Act), the Tuskegee Institute, and to State agricultural
9 experiment stations eligible for assistance under the Act of
10 March 2, 1887 (commonly known as the Hatch Act), to
11 carry out mission-oriented basic agricultural research. These
12 grants shall be made without regard to matching funds
13 being provided by the States in which the recipients are
14 located. All applications for funding pursuant to this section
15 shall, prior to approval, be submitted by the Secretary of
16 Agriculture to the Committee established by section 5 of
17 this Act for review and recommendation.

18 (b) For purposes of this Act, the term "mission-
19 oriented basic agricultural research" means agriculturally
20 related research on fundamental science topics with regard
21 to which—

22 (1) there is a basic need already in existence for
23 the new knowledge that would be generated by this
24 research;

- 1 (2) the research has a strong potential to be of
- 2 benefit to mankind; and
- 3 (3) the research deals with more than an unproven
- 4 concept.

5 **COMPETITIVE GRANT PROGRAM**

6 SEC. 7. In addition to any other grants made under Fed-

7 eral law, the Secretary of Agriculture is further authorized

8 to make grants, on a competitive basis, to Federal agencies,

9 research institutions, organizations, and individuals for the

10 purpose of carrying out agricultural and food research. These

11 grants shall be made without regard to matching funds being

12 provided by the States in which the recipients are located.

13 All applications for funding pursuant to this section shall,

14 prior to approval, be submitted by the Secretary of Agricul-

15 ture to the Committee established by section 5 of this Act

16 for review and recommendation.

17 **AUTHORIZATION OF APPROPRIATIONS**

18 SEC. 8. There are authorized to be appropriated for the

19 purposes of carrying out the provisions of this Act \$50,-

20 000,000 for the fiscal year ending September 30, 1977,

21 \$100,000,000 for the fiscal year ending September 30, 1978,

22 and \$250,000,000 for the fiscal year ending September 30,

23 1979.

1 **RECOMMENDATION FOR ADDITIONAL FUNDING OF**
2 **EXISTING PROGRAMS**

3 **SEC. 9.** It is the sense of the Congress that Federal
4 funding for agricultural research programs existing on the
5 date of enactment of this Act should be increased by \$250,-
6 000,000 annually.

The CHAIRMAN. Our first witness this morning is the distinguished ranking minority member of this committee, Hon. William C. Wampler.

I feel it is unnecessary to welcome you to this committee, Mr. Wampler, since you have as much right to be here as any of us. Needless to say, we are pleased to have you to speak to us about this significant piece of legislation.

STATEMENT OF HON. WILLIAM C. WAMPLER, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF VIRGINIA

Mr. WAMPLER. Mr. Chairman, I thank you very much for scheduling these hearings and for allowing me to testify before the committee on this important legislation. I am also appreciative that you have co-sponsored this legislation, as have 26 other Members of the Committee.

Today Mr. Chairman and my colleagues on the Agriculture Committee, we join to consider a matter of national policy. The question is whether or not our government is devoting sufficient priorities, emphasis, and efforts in agricultural research to provide for an expansion in food, fiber and forestry productivity to meet the needs of our own expanding population. Joined with our problem is the fact that the world is facing vast shortages of these products and the specter of mass starvation will loom over many countries by the year 2000.

My bills, H.R. 11743 and H.R. 11744, the "National Agricultural Research Policy Act of 1976," address this situation.

The question may arise, why, during a period of history when this Nation virtually fulfills the mythological dream of a land of cornucopia, are we considering means and ways to increase agricultural productivity?

Because, to quote the testimony of Dr. T. W. Edminster, Administrator of the Agricultural Research Service, USDA, in special oversight hearings on agricultural research and development, before the Subcommittee on Science, Research and Technology and the Subcommittee on Domestic and International Scientific Planning and Analysis of the House Committee on Science and Technology, on September 24, 1975.

"In the not too distant past, the high productivity of U. S. agricultural research was taken for granted. As agricultural researchers, we feel that in spite of the dramatic events of 1973 and 1974, this tendency may be recurring. U.S. agricultural projections, which estimate that past rates of increased production will continue to the year 2000 lean heavily on the assumption that new technology will be coming on stream at rates similar to those since World War II.

"Such projections are an expression of faith in the creative ability of the research community and in the foresight of administrators and legislators to commit the necessary resources.

"Although in the past 20 years, U.S. yield increases may have given us the equivalent of a second Corn Belt, the same dramatic achievement will be needed over the next 20 years. This will take concerted effort on the part of the entire Agricultural research community."

A November 10, 1975 report to the President by the National Academy of Sciences containing a World Food and Nutrition Study—"Enhancement of Food Production in the United States" and an "Interim Report"; oversight hearings this past year before the House Subcommittee on Science, Research and Technology of the Committee on Science and Technology, on agricultural research and development; a conference this past summer in Kansas City of the Agricultural Research Policy Advisory Committee and its report "Research to Meet U.S. and World Food Needs"; and my own study as a member of this Committee has convinced me of the urgent need for a revitalized and refurbished Federal agricultural research policy.

Let me share a thought with you—the other day a speaker at a seminar at Virginia Polytechnic Institute and State University said something like this: "Some 80 million souls lost their lives as a result of World War II, but this great catastrophe hardly caused a dent in the Malthusian predicted growth of the world's population."

Translated to census statistics, I am informed our population will expand from today's 214 million to 270 million by the year 2000, even with our current declining birthrate. And, during the same period the world's population will dramatically rise from 4 billion to between 6 and 7 billion souls.

We should also consider the following:

First, we can no longer meet the increased demands of the world for agricultural products by bringing idle land under cultivation. The nearly sixty million acre reserve from cropping that existed in the United States in the early 1970's is, for all extents and purposes, now gone. Among these lands are many acres that are inherently less productive and more subject to soil losses due to water and wind erosion; a situation we are gravely concerned about in this area is currently developing in our winter wheat belt in Oklahoma and Kansas.

Second, the use of fertilizers, which has been so successful in increasing productivity, is now said to be reaching a point of diminishing returns.

Third, the yield of such crops as corn appears to be nearing biological ceilings, unless there is a breakthrough in research.

Fourth, we must export large quantities of our agricultural products in order to maintain a favorable balance of trade and thus pay for our considerable imports of foreign oil to support our industries, our individual requirements, and yes, provide energy for our agricultural system.

In this regard, some have said we have reached the point in our economy where agriculture plays such an important part in the solution of the Nation's energy problems, that we either export food products to pay for imported gasoline which in turn allows Americans to drive to work or we stop exporting food and Americans walk to work.

Finally, and not all of the considerations by any means, is the continual decline of the U.S. farm population. U.S. farm population declined 1.2 percent a year from 1970 to 1974 and stood at about 9.3 million people in 1974. This means that 143,000 people migrated annually from farms or reclassification of their residence from farm to non-farm during this period.

This points up the economically disturbing fact that far too many of our people who play the key role in providing us with food, fiber, and forestry products, the staff of life so to speak, are finding it unprofitable to keep farming. This unprofitability is laid to increasing cost of land, equipment, labor, seed, fertilizers, etc. We must improve farm income if we intend to maintain a family farm system.

You and I know the real facts of our past accomplishments. We know it is no accident that Americans are eating the least expensive and at the same time the highest quality food in the world. We also know this is not a phenomenon in our history, but is the direct result of our fine agricultural research and extension effort carried out by the U.S. Department of Agriculture, our land-grant institutions and our State Agricultural Research Stations and the Extension Service working closely with the innovative and highly efficient American farmer and our business institutions—all operating within the framework of the free enterprise system.

However, the U.S. Department of Agriculture's Economic Research Service in this 1974 report gave this word of caution to our past accomplishments.

"An extensive inquiry was made into the root causes productivity change in agriculture. Factors considered were: mechanization, hybridization, fertilization, and pesticides. Change in aggregate agriculture productivity was made a function of changes in the adoption of these major technologies. There is strong evidence that these few technologies were responsible for the bulk of productivity change during this century. Since most of the major technologies were nearly exploited by 1960, the productivity increase has slackened since that time. For the future, minor technologies will contribute a modest improvement in productivity but major change will have to wait the discovery of new major technology."

This means the day has passed when we can take for granted our excellent past record in bettering our agricultural performance.

Before we continue on this point, I would like for you to examine with me past and current agricultural programs of our Federal government from a budgetary standpoint to determine if our current programs and the funding thereof, meet our problems of providing food, fiber, and forest product needs for the expected population expansion of our own country and the world; maintaining a balance of payments in international trade; lowering food and fiber production costs to increase farm income, and providing lower agricultural product costs to the American consumers.

The charts I have brought with me this morning most graphically demonstrate the problems we face. Secretary Butz brought this information in the first chart to the attention of the House Agriculture Committee during an appearance before the Committee in the first session of this Congress.

I ask that this chart No. 1 be inserted into the record.

The CHAIRMAN. Without objection, chart No. 1 will be inserted in the record.

[Chart No. 1 follows:]

USDA OUTLAYS

1969 - 1976 (Excluding Revolving Loan Funds)

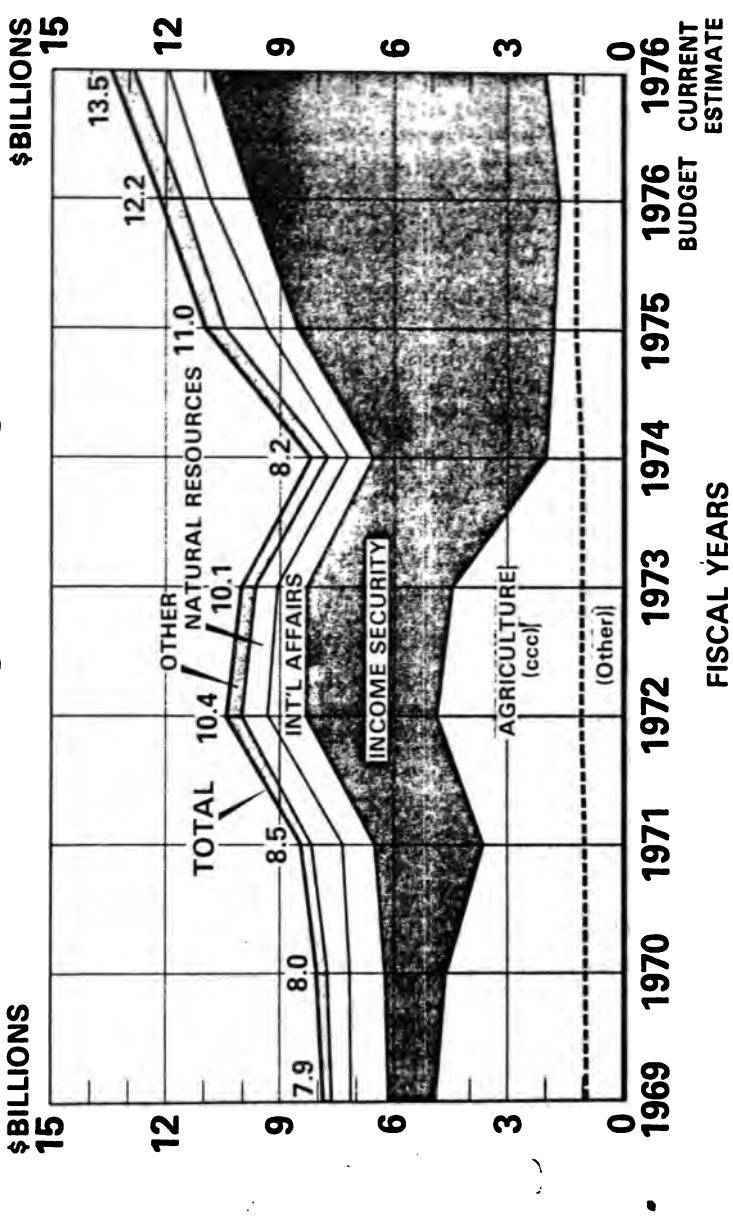


Chart 1

Mr. WAMPLER. This chart shows what has been happening with respect to the Department of Agriculture's budget over the past 7 years. Take special note of the trends which have been developing and how the USDA's main functions are no longer agriculture functions, but are instead welfare functions.

To me the most shocking revelation is the fact that the Agriculture Department's own budget people now refer to the Department's traditional activities, such as agricultural research, conservation programs, meat and poultry inspection, and related functions, as "other"! Unbelievable!

I have asked the Department of Agriculture to give me the specific expenditures for research which are not shown for the period in this chart, but are carried as OTHERS.

I ask that chart No. 2 be inserted into the record.

The CHAIRMAN. Without objection, chart No. 2 will be inserted in the record.

[Chart No. 2 follows:]

USDA OUTLAYS, 1969 - 1975

(Excluding Revolving Loan Funds)

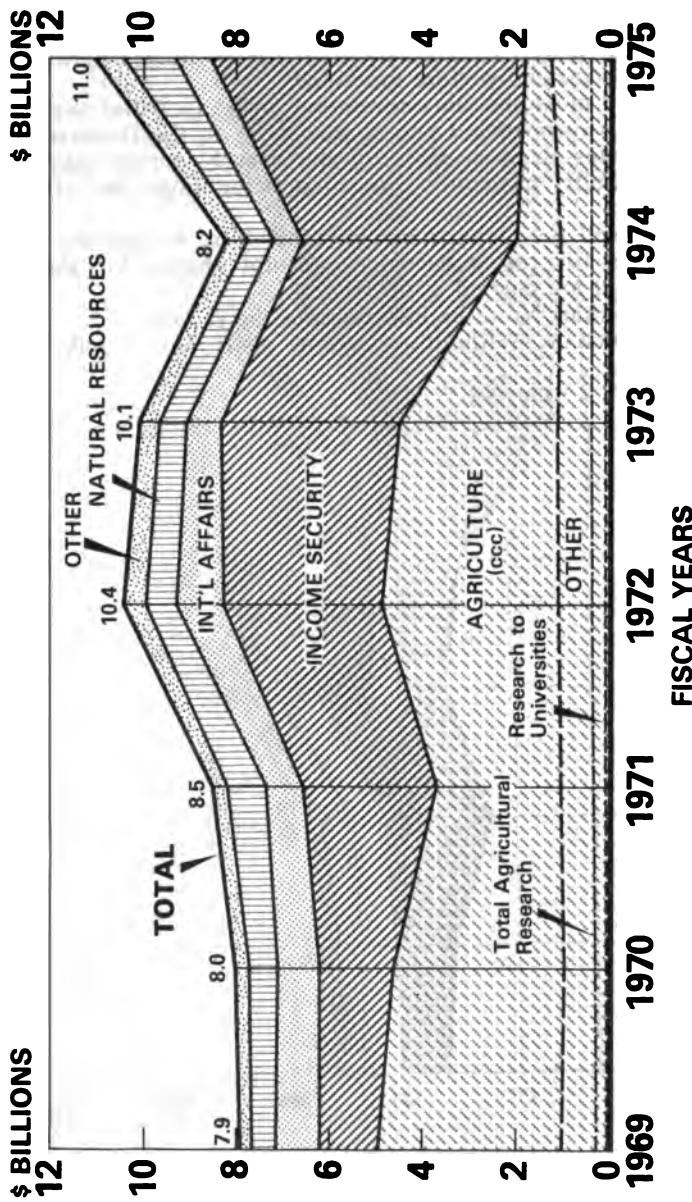


Chart 2

Mr. WAMPLER. In this second chart we see that in fiscal year 1969, total obligations for all USDA research amounted to \$267 million advancing to \$433 million in fiscal year 1975.

During the same period USDA obligations for research at universities and State agricultural research experiment stations only modestly advanced from \$62 million in fiscal year 1969 to \$108 million in fiscal year 1975. In considering these figures it is important to note that total agricultural research constitutes only slightly more than 3 percent of the total agriculture budget.

I ask that chart No. 3 be inserted into the record.

The CHAIRMAN. Without objection chart No. 3 will be inserted into the record.

[Chart No. 3 follows:]

USDA OBLIGATIONS FOR THE CONDUCT OF RESEARCH AND DEVELOPMENT, 1969 - 1975

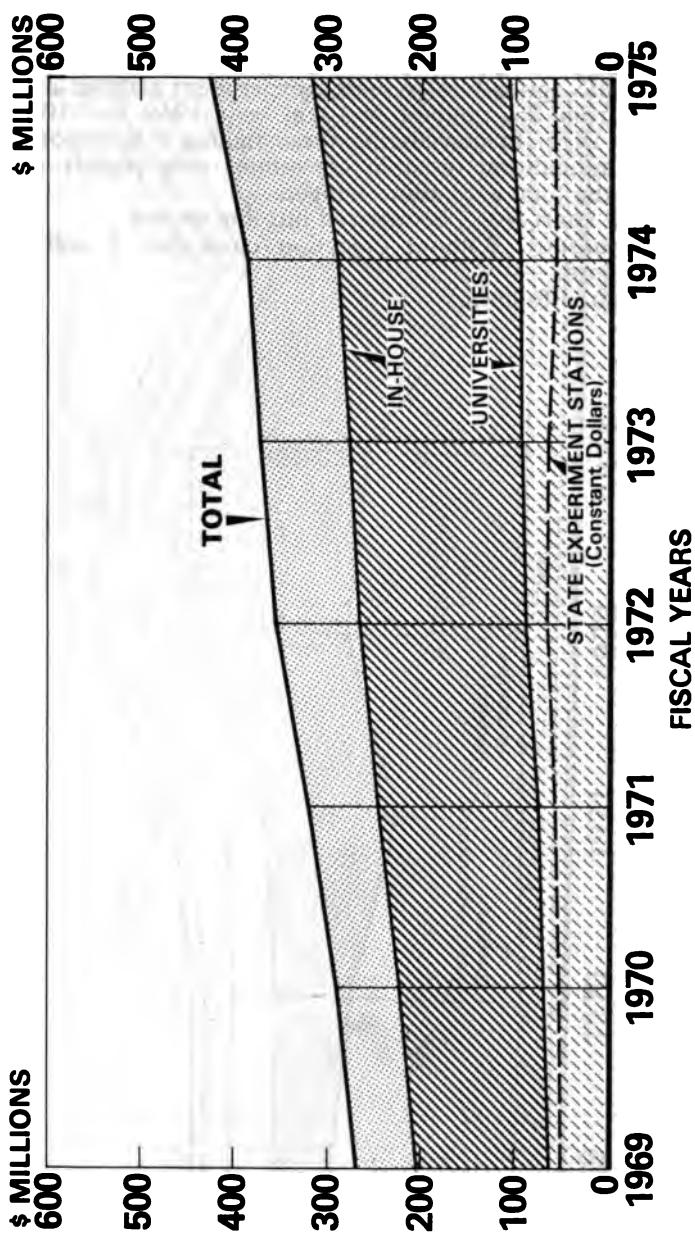


Chart 3

Mr. WAMPLER. In this third chart we are able to see even more significantly the decline in funding at universities and state experiment stations when we view the chart in constant dollars.

Beginning in fiscal year 1972 we see inflation beginning to take effect. These constant dollar figures are available only on Federal research funds expended at state agricultural experiment stations, but, they are significant when compared with budget obligations and point up the serious declining position of agricultural research funding, when we remember that most of the Federal funding at our state agricultural colleges are made to the State experimental stations.

In testimony before the House Subcommittee on Science, Research and Technology, Dr. Sylvan H. Wittner, Chairman of the Board of Agriculture and Renewable Resources, National Academy of Sciences, Director of the Agricultural Experiment Station, Assistant Dean of Agriculture and Professor of Horticulture at Michigan State University—who incidentally will testify later this morning—stated that five times as much for research is projected by HEW, ERDA, and considerably more by the National Science Foundation, than is projected for USDA in the current Federal budget.

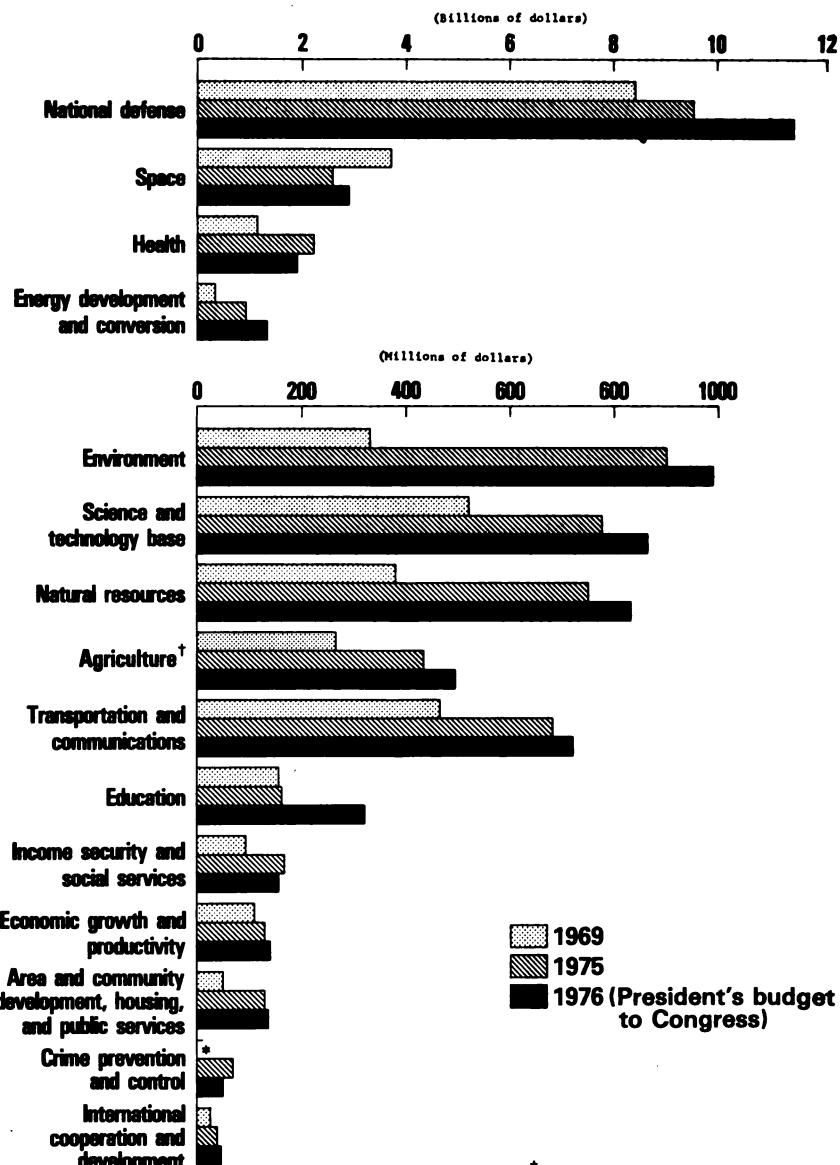
And research and development budgets for the U.S. Department of the Interior and the Environmental Protection Agency are projected for more than a 50 percent increase in this current year, while agriculture is to receive only a modest 11 percent increase over its low figure of \$433 million in the fiscal year 1975 budget.

I ask that chart No. 4 be inserted into the record.

The CHAIRMAN. Without objection, chart No. 4 will be inserted into the record.

[Chart No. 4 follows:]

FEDERAL R&D OBLIGATIONS BY FUNCTION
FY 1969, 1975 (est.) and 1976 (est.)



† Indicates covered and uncovered portion.

* Total in 1969 was \$4.8 million.

SOURCE: National Science Foundation

Mr. WAMPLER. This fourth chart is a blow-up of a most recent publication prepared by the National Science Foundation. As a matter of fact, I received the publication notice in my office only last Tuesday, February 10. Its title is "An Analysis of Federal R & D Funding, by Function, Fiscal Year 1969-1976."

This chart, in my opinion, is the best one of all. It is found on page 6, of the NSF Analysis.

I ask you to examine it closely and tell me, according to this chart, if the Agriculture Department is conducting any research whatsoever? You cannot find agricultural research on this chart because the National Science Foundation does not consider agriculture as a primary function of this Government.

And I have my own thoughts on the views of the Office of Management and Budget on this matter also. If you go back to the first chart and view the "Others" line in the same regard, I think you will get a better appreciation for the need for this bill.

Just so you don't get too concerned, I'm going to ask my Assistant to fill in the blank space on the chart so we can compare the funding of agriculture research and development with that of all the other R. & D. functions of our government.

To clarify matters, the National Science Foundation carries agricultural functions under the heading "Natural Resources". Even under this heading, food research of the total agricultural sub-functions amounted to 46.2 percent of the natural resources total in 1969, 40.7 percent in 1974, 35.7 percent in 1975 and 36.4 percent in 1976; or "its share of this function has dipped from almost one-half in 1969 to somewhat more than one-third in 1976 as other sub-functions (such as mineral) have grown", to quote Page 36 of the NSF Analysis.

Before I proceed further I want to again insert an important quote from Dr. Edminster, Administrator of the Agricultural Research Service, in his testimony before the Subcommittee on Science, Research and Technology last September. I quote:

Frankly, as scientists and engineers, we are becoming increasingly concerned about the real likelihood that we cannot sustain the rate of flow of new technology we enjoyed in recent years, despite our great confidence in the agricultural research system in the United States. This concern is based on the. (1) general slippage in research capacity during the past 10 years due to inflationary costs, (2) higher constant dollar cost in researching increasingly complex problems, (3) new and greater responsibilities to maintain and improve the environment, (4) increasing demands for safe nutritionally acceptable foods, (5) increasingly regressive pressures placed on high yielding plants and animals by the environment, insect pests, and diseases, (6) new technology demands caused by high energy prices, use of marginal lands, consumer demands, and inability to use certain existing technology, (7) persistent and formidable yield barriers and (8) erosion of technology reserves.

During the period of readily available agricultural production capacity, the argument was forcefully made that it did not make sense to increase agricultural research at a time when food and feed reserves were so large. The logic of that argument gave little weight to the time lag between research expenditures, research results, technological development and adoption, yet it was sufficient to stabilize expansion of research programs. For example in 1965, agricultural research funding from federal, SAES, and industry sources was estimated at \$854 million. A comparable estimate for 1975 was about \$1.6 billion. After discounting for inflation, the 1975 expenditure had less purchasing power than the amount spent in 1965. A similar pattern existed for ARS. While the real value of the budget was no higher than 1965, the new thrusts of human nutrition, environmental quality, and other special problems were funded out of increases by or program redirections, the result being inadequate funding for production and marketing research.

The contribution that agricultural research can make to a safe and adequate food supply, reasonably priced, must place it as one of the highest research priorities. To achieve this objective will require an increase in priority for research well above that of 10 years ago and above the present 2 percent share of the Federal R. & D. budget.

At this point, I would like to include in the record a USDA chart, titled: Table 11—Appropriations for Research and Education, fiscal years 1968 through 1976, Transition Quarter, and Budget Estimate for 1977, Office of Management and Finance, USDA, L & FR-77H-503, January 28, 1976, a copy of which is attached to my testimony for your perusal.

The CHAIRMAN. Without objection, Table 11 will appear in the record.

[The table submitted by Mr. Wampler follows:]

**Table II -- Appropriations for Research and Education, Fiscal Years 1968
Through 1976 - Transition Quarterly Budget Estimates for 1977**
(Amounts adjusted for comparability with the appropriation structure in the 1977 Budget)
(Thousands of Dollars)

Agency or Activity	1968	1969	1970	1971	1972	1973	1974	1975	1976	Transition	
										Budget	Change, 1977 With 1976
Research:											
Agricultural Research Service /.../	\$164,239	\$163,862	\$160,066	\$178,568	\$101,746	\$200,116	\$205,032	\$205,355	\$203,209	\$ 64,393	\$263,262 \$ -7
Special foreign currency program	6,467	4,967	4,966	4,966	9,966	9,965	4,965	7,464	1,861	10,000	+2,536
Cooperative State Research Services:											
Payments to agricultural experiment stations and penalty mail	50,129	51,013	53,944	59,997	63,443	67,300	68,242	76,964	82,630	20,658	95,278 +12,648
Grants for cooperative forestry research	3,370	3,485	3,785	4,612	4,672	6,464	6,203	7,070	7,462	1,866	7,462 -
Contracts and grants for scientific research	1,800	2,000	2,000	3,000	12,500	15,400	11,583	15,226	19,546	6,886	15,932 -3,594
Grants for facilities	2,000	--	1,000	--	--	--	--	--	--	--	--
Funds for rural development research	--	--	--	--	--	--	--	--	--	--	-1,440
Federal Administration	1,731	1,692	1,927	2,129	2,431	2,396	2,537	3,051	3,252	543	3,816 +434
Statistical Reporting Service	376	393	565	554	487	588	1,157	2,016	2,016	504	2,604 +728
Economic Research Service	13,393	14,014	15,524	16,524	17,181	18,755	19,791	22,562	23,793	6,217	26,116 +223
Farmer Cooperative Services	894	944	1,029	1,099	1,123	1,176	1,360	1,156	1,224	318	1,272 +18
Forest Service	41,223	40,096	43,270	45,221	51,152	61,066	61,712	77,612	80,355	21,337	86,951 +4,536
Total, Research	262,720	260,363	280,385	300,025	300,025	300,025	300,025	300,025	300,025	309,353	+15,282
Education:											
Extension Services:											
Payments for competitive agricultural extension work	69,869	93,722	126,885	155,476	166,214	187,856	197,236	207,654	220,623	55,374	210,214 -10,409
Federal administration and coordination	3,619	3,557	4,849	5,476	6,085	6,475	6,837	7,869	8,312	2,079	8,576 +264
Total, Education	93,485	97,279	131,736	160,930	172,279	194,311	204,073	215,523	228,935	57,453	218,790 -10,145
Total, Research and Education	361,120	359,999	422,077	481,297	530,313	582,237	590,326	649,069	723,466	161,178	728,623 +5,187

NOTE: Details may not add to totals shown due to rounding.
/ Includes transfers of \$15,000,000 from Section 32 funds for each Fiscal Year from 1968 through 1975.

Mr. WAMPLER. In the hearings, my observations, and my readings on the problems confronting the United States, there is also strong evidence that we must make some significant upgrading of the priority of the agricultural research budget if we are going to meet the challenges before us.

My findings also point out the necessity for a modification in the management of research in the Department of Agriculture itself, and the research system that now covers programs for agricultural research in the land-grant colleges and the State agricultural experiment stations, the National Science Foundation, the National Institutes of Health, HEW, EPA and the Energy Research and Development Administration. All carry out some research relating to farming.

Such fragmentation greatly hinders our ability to focus the vast research capabilities of this Nation on the research needs of highest priority. Moreover, the research effort as to priority and funding needs to be represented at the highest councils of the Department of Agriculture. It is also apparent that the Secretary needs a highly competent, fully representative, research policy council to which he can turn for overall advice and review of research priority and long range goals and planning.

It is also apparent that the current funding of research as to in-house projects and research at our land-grant colleges, our state agriculture experiment stations, and support for outside institutions and individuals must be expanded and better balanced.

This entails specifically new forms of 100-percent Federal grant programs to insure we preserve the outstanding mission-oriented research capabilities we possess at our land-grant and other agricultural colleges and our State agricultural experiment stations.

We also need a new competitive grant process to give us a broader access to the whole scientific community, outside present funding channels, thus broadening the range of knowledge applied to the problems of agriculture.

From what I am told—and this will be confirmed by subsequent witnesses—a revitalized Federal agricultural research program and budget is necessary to tackle basic research in such promising areas as: fundamental knowledge about photosynthesis, nitrogen fixation, crop and livestock protection, water and nutrient efficiencies, genetics, biochemical aspects of handling and processing of crops, livestock, and fish, and plant soil and water relationships.

To realize these goals, I have introduced corrective legislation.

This legislation was originally introduced as H.R. 11339, on December 19, 1975 and is titled the National Agricultural Research Policy Act of 1976. The bill was subsequently modified, on recommendations of many land-grant institutions, the Directors of State agricultural research stations, and others concerned with agricultural research; and was reintroduced on February 5 and given the numbers H.R. 11743 and H.R. 11744.

Its purposes are:

To emphasize agricultural research as a distinct mission of USDA;

To be certain that all agricultural research is effectively coordinated; and

To provide a mechanism for identifying the Nation's highest priority problems for agricultural research.

To accomplish these purposes, the bill:

1. Establishes a new Assistant Secretary of Agriculture for Agriculture Research to coordinate all research relating to Agriculture, food production and nutrition conducted or financed by or affiliated with USDA;

2. To assist the new Assistant Secretary he is provided in law with an Agricultural Research Advisor and a staff of specialists.

3. Establishes a 15-man National Agricultural Research Policy Committee to review and to recommend establishment of programs, policies, and goals of agricultural research agencies in USDA and other agricultural research programs outside the Department.

Additionally the committee establishes and develops national policies, priorities and strategies for agricultural research for both the short and the long term. This committee would also review and make recommendations to the Secretary of Agriculture for two new grant programs established by this bill. They are mission type grants and competitive grants. The Research Advisor and the staff of the new Assistant Secretary for Research provide staff support for the Policy Committee.

4. To finance these new grants the bill authorizes expenditures of \$50 million in fiscal year 1977, \$100 million in fiscal year 1978, and \$250 million in fiscal year 1979. Additionally, the bill recommends in a sense of Congress section that existing Federal funding under the Hatch Act to land-grant colleges and other ongoing—including in-house—research programs should be expanded by \$250 million annually.

Since the bill has been introduced there have been some recommended changes. Principal among them are: modification to the make-up of the membership of the National Agricultural Research Policy Committee to add more scientific representation on this committee, such as four representatives from the Division of Agriculture from the National Association of State Universities and Land-Grant Colleges; the removal of the requirement from the committee to review grant applications under the two new grant programs authorized under the bill; and the assigning of this task under the new Assistant Secretary for Research or some other similar arrangements.

I am agreeable to these changes, as well as some others that have been offered. I would recommend, however, against any further major modification of the Research Policy Committee, so as to preclude unwieldiness or to reduce its number below its present makeup and thus destroy its representativeness, which I feel is sorely needed.

I believe the concept of the bill is proper, timely, and needed to carry agricultural research into the future.

I urge your support of this bill.

Mr. DE LA GARZA. Thank you very much. Mr. Wampler.

I think probably that there may be some specific questions. Are there any members who would like to ask specific questions?

Mr. Thone?

Mr. THONE. Very briefly, let me compliment the gentleman from Virginia. There is no doubt that we are engaged in extensive agricultural research, but I sure agree with the gentleman from Virginia that his bill H.R. 11743, or one similar, is proper and timely and is needed to effectively carry agriculture into the future years for

the development of new technology and a better understanding and use of existing technology that we have.

Thank you, Mr. Chairman.

Mr. DE LA GARZA. Mr. Poage?

Mr. POAGE. Mr. Wampler, I too feel that you are on good safe ground in suggesting the expansion of agricultural research. I think it is essential to our being able to feed and clothe our people.

I think the only problems which arise are those of the mechanics as to how we proceed.

You have discussed in general terms, without any elaboration, the techniques as to how we are going to move into the action areas. I think there are two phases which are particularly important there.

You have mentioned several times the land-grant colleges and others.

What others does your bill include?

Mr. WAMPLER. Mr. Poage, there are a number of institutions of higher learning which do not carry the designation of a land-grant college or university. They have expertise. They have the desire. They have the ability to perform many of these functions. So, we feel like they should be brought in and given an opportunity on a competitive basis.

Mr. POAGE. I do too.

I'm asking what others do they include.

Mr. DE LA GARZA. Texas A&I in Texas is one of these.

Mr. POAGE. I hope it includes A&I.

Mr. WAMPLER. For example, Duke University in North Carolina is one.

Mr. POAGE. Duke University is not a public institution.

Mr. WAMPLER. That is true. But, I'm told there are others all over the country that fall into the category as mentioned by the gentleman from Texas, Mr. de la Garza.

Mr. POAGE. Does the bill contemplate making grants to private or church universities?

Mr. WAMPLER. It certainly would permit them to be, but it's not limited to public-supported institutions. There are other institutions of higher learning and these would be both public and private.

Mr. POAGE. Then there is no preference given to the land-grant colleges as against those that were not so fortunate to have received the land-grant?

Mr. WAMPLER. As I understand it, the thrust of the bill is not to disturb our traditional funding channels through the Hatch Act and the Morrill Act and the McIntyre-Stennis and others that I think have worked well to date.

This will simply permit additional 100 percent Federal grants on a competitive basis or otherwise for building another tier on the basis of what we presently have which I think has worked reasonably well.

So, this is not designed to disrupt our traditional funding channels but simply to provide additional ones.

Mr. POAGE. It would then make grants available to A&I in Texas?

Mr. WAMPLER. That would be my understanding.

It would include but not be limited to A&I.

Mr. POAGE. Let me turn to another phase of the bill which I confess I do not quite understand.

I think that a great deal of this work can be properly done in the colleges. I have no quarrel with that.

But, a great deal of it should be done in a Federal research institution or institutions. Each one of us has something; has a special interest in this.

Our Forage and Grassland Research Center at Temple, Tex., should in my opinion be in the coordinating centers for all the research in forage and grasslands, including the work done in the universities with Federal grants.

I would not suggest that any State or private institution that wanted to should be privileged to carry on all the research they wanted to if they paid for it, but if it is paid for by the Federal Government then it seems to me it should be coordinated in that case by the Grasslands Research Center.

There is a research center in Ames, Iowa, on the handling of meats. You would coordinate your work through those centers rather than to establish, that is to directly establish, duplicated activities in other areas.

I understand that some of that work should be done in educational institutions, but a great deal of that work needs to be done on the ground. It cannot all be done in one place.

Certainly I'm not suggesting that all of the research on meats be done at Ames, Iowa. I'm not suggesting that all of the research on grasslands be done at Temple, Tex.

I'm simply saying there should be coordinating centers. I think we should not have one dozen research programs of the same kind going on all over the country at the same time.

I think we have had that in a great many cases in the past.

I think one of our greatest weaknesses in our present research program is the unnecessary and useless duplication which goes on.

I would be interested to know just what the bill does in the way of preventing that kind of duplicated work. What do you do there?

Mr. WAMPLER. Let me say to you, Mr. Poage, that I share your concern.

That was part of the purpose of this bill, that is to have more effective coordination. I quite agree with you.

There are many areas where the on-going research is done in Federal institutions and that is correct.

It is the intent of the bill through the establishment of this 15 member committee where we will have broad representation to get more effective coordination and stop the duplication and to get what we think will be greater input from all sectors of agriculture that are concerned with research and for this committee to help us establish the priorities that we need to be proceeding with.

This is not to disrupt meaningful research.

Mr. POAGE. The thing that disturbs me and makes me wonder is the emphasis in all of the discussions that I've heard on this bill has been that the Federal Government gives grants to colleges. The colleges do good work and the proper work. They do essential work. I want to keep colleges in the picture, but I do not want to turn the Federal agricultural research over to the colleges of the United States.

Mr. WAMPLER. Mr. Poage, that is not the intention of the bill. It is to have better coordination to use those facilities which we have in our land-grant colleges and universities to supplement the on-going in-house programs that we have in the Department of Agriculture.

Mr. POAGE. How does it do it?

Mr. WAMPLER. I think that the fact that this bill through the authorization of appropriations and making additional funding for existing programs, these two things, will give us the means to do what we want to do.

Mr. POAGE. This bill does not make additional funding for the Federal research centers, does it?

Mr. WAMPLER. Yes, it does.

Section 9 of the bill says that it is the sense of the Congress that Federal funding for agricultural research programs existing on the date of enactment of this Act should be increased by \$250 million annually.

Mr. POAGE. That has no effect whatever except good wishes. That sense of Congress does not move any money. That sense of Congress does not transfer a dime. It does not change anything.

That authorization for Congress to appropriate money does change things.

To whom does that authorization run? That's what I'm getting at. That sense of Congress is window-dressing and we all recognize it.

As to what it does, I'm not sure. I understand that it specifically provides for greater authorization for more money to the colleges. I'm not finding fault with that.

But, I want to be sure that you are not weakening the Federal research centers because I think they have a very important place to play in this.

Mr. WAMPLER. I do not disagree at all.

Mr. POAGE. The bill then simply hopes that it will take care of them, is that correct?

Mr. WAMPLER. Let me say to the distinguished gentleman from Texas that in the budget procedures this committee will have meaningful input as we review the President's proposed budget for fiscal year 1977.

Mr. POAGE. That is right, but this bill does not change our authority one iota as to the Federal research centers, is that correct?

Mr. WAMPLER. It is not designed to subtract from, but it's designed to supplement.

Mr. POAGE. It does not add to them either, does it?

Mr. WAMPLER. It is hoped that it will add to the total thrust of research.

If the gentlemen will join with me maybe we can make the sense of Congress meaningful.

Mr. POAGE. I will join with you because I agree with you. I certainly want to go along with you toward improving the research both in the colleges and in the Federal research centers.

But, I certainly don't want to get caught in a trap that is going to move the control of our Federal research into either state or private colleges.

Mr. WAMPLER. I think the distinguished gentleman from Texas and I are in agreement on that. It is not the intent of this bill in any way to detract from the Federally financed programs—the ones in-house in the Department and otherwise.

Mr. POAGE. Thank you. I appreciate the gentleman's statements. I do not want to be critical.

I want to be sure that we take care of both sides.

Mr. WAMPLER. That is absolutely the intent of this bill.

Mr. DE LA GARZA. Mr. Wampler, we are going to revert back to the usual practices of this committee and we will excuse you for the time being.

If there are any other questions for Mr. Wampler, we will take care of them in a question-and-answer period.

Our next witness is Mr. Robert Long, Assistant Secretary of Agriculture for Conservation, Research and Education, U.S. Department of Agriculture.

I understand you are being accompanied by Mr. David Ward.

We are happy to have you here, Mr. Long.

STATEMENT OF ROBERT W. LONG, ASSISTANT SECRETARY FOR CONSERVATION, RESEARCH AND EDUCATION, U.S. DEPARTMENT OF AGRICULTURE; ACCOMPANIED BY DR. DAVID WARD, ACTING COORDINATOR OF ENVIRONMENTAL QUALITY ACTIVITIES

Mr. LONG. Mr. Chairman and members of the committee. Thank you for this opportunity to present the views of the Department of Agriculture on H.R. 11743, the National Agricultural Research Policy Act of 1976.

The Department does not recommend the enactment of H.R. 11743. However, we believe the bill will further the dialogue necessary for considering proper actions to be taken to strengthen and solidify our already substantial agricultural research effort. We must learn how to feed, clothe and provide shelter and suitable living conditions for 85 percent more people in the next 25 years.

The avenues open to us for doing this are largely through the development of new technology and better understanding and use of existing technology. There are few topics more important for our government to consider than the course to be followed in ensuring a sound system of agricultural research tuned to meet the challenges and demands of the future.

Our definition of agricultural research includes food, fiber, forestry and wood products, ornamentals and turf, rural people and communities, and socioeconomic and ecological systems.

There are four principal groups of organizations involved: (1) agencies of the Department of Agriculture having research responsibilities, (2) the State experiment stations associated with land-grant colleges and universities, (3) corporate research bodies and (4) other Federal agencies.

Private foundations, not-for-profit research organizations, and some universities not in the land-grant system complete the U.S. agricultural research and development picture.

The Nation has a very sizeable agricultural research and development system. It is diverse and complex. The publicly supported agricultural research system expends Federal, State, local, and private funds.

Taken together, four major research agencies in USDA, 56 State agricultural experiment stations, 16 land-grant colleges of 1890 and Tuskegee Institute, and 19 cooperating schools of forestry invest about \$800 million annually for agricultural research and development. This involves about 10,600 scientist-years. We estimate this represents about 95 percent of the Nation's publicly-supported agricultural research and development.

The entire \$800 million publicly-supported agricultural research and development effort is documented in detail, project-by-project, in the computerized Current Research Information System (CRIS). We understand that corporate research members of the Agricultural Research Institute are meeting currently to discuss ways in which information about corporate R&D activities can be assembled and aggregated in ways that will be more informative and useful.

This information is to become available to all research leaders along with that from CRIS, so decisionmakers can make the best possible use of available resources.

The agricultural research system does work. Its successes represent one of the outstanding chapters in the annals of this country. It has flexibility to meet changing conditions and to respond to national opportunities and problems. But it can work better. And must work better if the challenges of the future are to be met.

I would now like to comment specifically about the major provisions of H.R. 11743.

The Secretary needs organizational flexibility to carry out his broad and complex responsibilities. While it may be advantageous to provide authority for an additional Assistant Secretary, we believe that the specific organization of the Office of the Secretary should remain the prerogative of the Executive Branch. The responsibilities of any assistant secretary should be determined by the Secretary of Agriculture in light of his total responsibilities.

Incidentally, we do have a bill pending for the Congress to create an additional Assistant Secretary for the Department.

Though we do not solicit authority for an additional Assistant Secretary, we are opposed to the concept only if such a person's area of responsibility is to be predetermined by the Congress. Filling any new position would, of course, be subject to review within the Administration.

We recognize the need for improved agricultural research planning and coordination. But it is not a new concept. Close working relationships between the Department of Agriculture and the State agricultural experiment stations have been developing for nearly 100 years.

Building on these many years of experience, planning and coordination within the publicly-supported agricultural research system came into sharp focus about 10 years ago with a congressionally mandated study that led to "A National Program of Research for Agriculture." That study defined the then existing scope of agricultural research and development, described future goals and objectives, and outlined steps to be taken to meet those targets. It gave rise to CRIS and many other developments that have improved publicly-supported agricultural research in ways that best serve the needs of the Nation and the world.

I have referred to the State administered research programs in agriculture. State legislatures appropriated \$281 million in support of those programs in fiscal year 1975. Through partnership relationships with leaders of State programs, we have tried to recognize State priorities and needs along with national requirements, many of which are in common.

Through joint State and Federal planning and coordination we hope to encourage strong State support as well as to justify increased Federal funding of needed research to meet agricultural needs.

For a number of years we have had the Agricultural Research Policy Advisory Committee (ARPAC). It has served as a policy body for agricultural research. It is jointly sponsored by the Secretary of Agriculture and the president of the National Association of State Universities and Land Grant Colleges.

I am co-chairman of ARPAC with Dean Orville Bentley of the University of Illinois College of Agriculture.

With your permission, Mr. Chairman, I would like to offer for the record a copy of the Memorandum of Understanding authorizing and establishing ARPAC as well as a copy of the policy statement for its principal subcommittee the National Agricultural Research Planning Committee (NPC).

The CHAIRMAN. Without objection this material will be incorporated into the record.

[The Memorandum of Understanding and Policy Statement may be found on p. 36]

Mr. LONG. ARPAC's membership includes a comprehensive representation of USDA and university agricultural research and development interest. It also includes a member from the Agricultural Research Institute through which industry research interests are represented.

We believe the creation of a National Agricultural Research Policy Committee would duplicate existing coordinating groups. However, if it is the will of Congress to provide a legislative basis for agricultural research planning and coordination, we believe ARPAC provides for foundation upon which to build.

We believe that any legislatively mandated National Agricultural Research Policy Committee (NARPC) should receive its leadership and the largest part of its membership from USDA and the National Association of State Universities and Land Grant Colleges. There are, of course, other organizations that should logically be included in agricultural research planning and coordination activities.

We have taken the leadership in the Federal Council for Science and Technology in moving toward greater involvement of other Federal Agencies in planning and conducting food research. We intend to work toward further improvements in communication and coordination among all kinds of organizations conducting agricultural research and there are many.

A National Agricultural Research Planning Committee already exists as a subcommittee of ARPAC. This subcommittee addresses itself to planning between USDA research agencies and the university organizations.

Its work is vital to providing the exchange of information about current and projected research activities, the identification of problems

requiring research attention, and the development of plans for moving the entire system forward to meet identified needs with the best use of available resources.

If a National Agricultural Research Policy Committee is legislatively mandated, under the leadership of USDA and the National Association of State Universities and Land Grant Colleges (NASULGC), we believe it should function in lieu of the present ARPAC.

The Secretary of Agriculture and the president of NASULGC, respectively, should designate the co-chairman and the individuals to fill individual membership slots. The committee should report to the Secretary and the president of NASULGC and through them to the President and the Congress.

H.R. 11743 proposes that a senior scientist serve in the Office of the Secretary and report to the proposed Assistant Secretary for Agriculture responsible for agricultural research. We see no need for a new or separate position to meet the responsibilities outlined in H.R. 11743.

Again, we strongly object to congressional action that would require the Secretary of Agriculture to organize the Department in very specific ways. We feel it is extremely important that our agency heads have immediate access to the Assistant Secretary and not be burdened with extra administrative layers to work through.

USDA and the universities are providing staff support for the activities of ARPAC and NPC, including joint support of CRIS. In the Office of the Secretary, a staff officer who is incidentally a scientist in his own right, assists with this coordination. Salaries, travel and other expenses associated with participation of USDA research administrators in ARPAC, NPC and the Regional and National Agricultural Research Planning Process are borne by the respective employing organizations.

In my judgment, this insures not only broader financial support, but also that there is general agreement that activity to be pursued has high priority. It gives participating organizations a direct sense of involvement and responsibility. We believe it is a good practice and recommend its continuation. Thus, we do not endorse section 5(e) of H.R. 11743.

H.R. 11743 would provide authority for grant programs. Section 6 relates to mission-oriented basic agricultural research. Section 7 relates to research grants on a competitive basis. The Department of Agriculture now has authority under Public Law 89-106 for meeting the objectives of the proposed sections 6 and 7. Additional authority is not needed. Faced with complex national priorities, we must oppose significant expansions of existing Federal programs such as those represented by sections 6 and 7 of H.R. 11743.

I recognize the value of the renewed interest in research that H.R. 11743 is generating, for it seems clear that the Nation must move toward substantially increasing its support for agricultural research. We need the support, not new legislation. Within USDA, Secretary Butz and I have acted to secure for agricultural research and development favorable consideration among those parts of the Department's programs over which we have budgetary flexibility.

The President has clearly and repeatedly stated his strong opposition to unnecessary increases in Federal expenditures. While all of us sup-

port improved agricultural research coordination, we cannot support the major increases in Federal expenditures proposed in this bill.

Mr. Chairman, these hearings provide an opportunity for the executive and legislative branches of government and the agricultural research system to explore means to improve the Nation's agricultural research effort.

I pledge my personal cooperation and that of the Department of Agriculture for such an undertaking.

I again appreciate the opportunity to present this statement and we are prepared to respond to questions related to our testimony.

[The material referred to earlier by Mr. Long follows:]

NPC POLICY STATEMENT

Agricultural Research: the Regional and National Planning and Implementation System for Agricultural Research; and the Role and Function of the National Planning Committee 1/

Agricultural research deals with the discovery, combination and synthesis of knowledge essential to the continuing production and effective use of food, fibre, clothing and shelter under changing economic, social and political conditions in the U. S. and the world; it deals with the protection of producers and consumers and with the wise use of natural resources; it involves the elucidation of a broad spectrum of public policy alternatives and consequences for people on and off the farms; and it includes research designed to add to basic knowledge that will advance these aims. It requires the continuing detailed and specific attention of scientists who specialize in many aspects of each of the major systems involved — physical, biological, economic, social and political. Agricultural research is associated with other science and with education and training of scientists via disciplinary groups. It is also involved in application of research findings with Extension, industry and other Federal, State and local government agencies and organizations.

The Regional and National Planning and Implementation System is intended to perform a supportive role to agricultural, forestry and related research as it is organized and conducted in the United States. Principal initial emphasis is on publicly supported research.

1/ Adopted by the National Agricultural Research Policy Committee (NPC), May 7, 1974; approved by the Agricultural Research Policy Advisory Committee (ARPAC), June 10, 1974; revised by NPC September 27, 1974; and approved by ARPAC November 6, 1974.

The purpose of the Regional and National Planning and Implementation System is to plan programs at all levels -- local, regional and national -- to assure a high degree of effectiveness, efficiency and responsiveness to public needs. This is to be achieved through improved coordination among federal, state and industry research organizations by means of improved team analysis of program needs, priorities and appropriate definitions of roles and objectives for performing and financing research. A still better use of available resources in research will be sought by providing an improved mechanism for the sharing of research planning information, by providing a mechanism for establishing priorities of research and by influencing integration of efforts toward desired objectives.

Priorities for research will be formulated by utilizing the inputs of scientists, research program task forces, research program groups, regional planning committees and the National Planning Committee. Additional guidance on research priorities will be solicited from third parties and legislative bodies. Improved reallocation of research resources and the continued viability of the system will require that both decision-makers and scientists react positively to the improved information and priorities thus obtained.

Specific objectives of the system include: (1) to maximize the effective utilization of scientists, facilities and equipment; (2) to avoid unnecessary duplication; (3) to minimize the danger of important research needs being overlooked; (4) to avoid the fragmentation of effort; (5) to direct resources to high priority objectives; and (6) to identify emerging problems of national significance.

The Role and Function of the National Planning Committee (NPC) is to establish uniform procedures for the operation within the regions of the Regional and National Planning and Implementation System; monitor performance; to review inputs from the regions; and to evolve a national plan for each cycle of the operation.

More particularly, NPC will exercise a key role within the system in the following manner (without limiting NPC to these items, alone):

1. Determine time schedules and formats and make requests for inputs from the regions;
2. Participate in coordinating activities among RPC's;
3. Provide for the aggregation and analysis of research planning information including, but not limited to, that obtained from the regions;
4. Initiate and participate in special studies of emerging needs of national significance;
5. Recommend priorities among major research areas and needs;
6. Assist in and influence implementation of the national plan.

November 21, 1974

Proposed Revision of NPC
Policy Statement to be Submitted

to ARPAC for Approval
on November 6, 1974

THIRD PARAGRAPH

Revised language - New words are underscored

The purpose of the Regional and National Planning and Implementation System is to plan programs at all levels -- local, regional and national -- to assure a high degree of effectiveness, efficiency and responsiveness to public needs. This is to be achieved through improved coordination among federal, state and industry research organizations by means of improved team analysis of program needs, priorities and appropriate definitions of roles and objectives for performing and financing research. A still better use of available resources in research will be sought by providing an improved mechanism for the sharing of research planning information, by providing a mechanism for establishing priorities of research and by influencing integration of efforts toward desired objectives.

Previous language - Version approved by ARPAC, June 1974

The mission of the Regional and National Planning and Implementation System is to promote coordination among federal, state and industry research organizations by means of improved team analysis of program needs, priorities and appropriate definitions of roles and objectives for performing and financing research. A still better use of resources in research will be sought by providing an improved mechanism for the sharing of research planning information, by providing a mechanism for establishing priorities of research and by influencing integration of efforts toward desired objectives.

FIFTH PARAGRAPH

Revised language - New words are underscored

Specific objectives of the system include: (1) to maximize the effective utilization of scientists, facilities and equipment; (2) to avoid unnecessary duplication; (3) to minimize the danger of important research needs being overlooked; (4) to avoid the fragmentation of effort; (5) to direct resources to high priority objectives; and (6) to identify emerging problems of national significance.

Previous language - Version approved by ARPAC, June 1974

Other objectives of the system include: (1) to identify emerging problems of national significance; (2) to maximize the effective utilization of scientists, facilities and equipment; (3) to avoid excessive duplication; (4) to minimize the danger of important research needs being overlooked; (5) to avoid the fragmentation of effort; and (6) to prevent waste of resources on low priority objectives.

MEMORANDUM OF UNDERSTANDING
BETWEEN THE
U.S. DEPARTMENT OF AGRICULTURE
AND THE
NATIONAL ASSOCIATION OF STATE UNIVERSITIES AND LAND-GRANT COLLEGES

Agricultural Research Policy Advisory Committee

The responsibility for publicly-supported agricultural research in the United States is largely shared by the USDA and the State Land-Grant University's Agricultural Experiment Station (SAES), colleges of 1890 and Tuskegee, and Forestry Schools. The common objective to which this cooperative research effort is directed are:

- To solve local, regional and national problems affecting agriculture, forestry, other renewable natural resources, and rural life.
- To provide scientific expertise to local, State and Federal government agencies, private organizations and individuals.
- To provide scientific competence for teaching and to make available increased research opportunities for graduate students.
- To provide scientific expertise and research in support of programs that relate to foreign nations.

Excellent progress has been made in recent years toward the attainment of these objectives through more effective joint planning and coordination of USDA and SAES research. Rapidly changing conditions require further strengthening of this cooperative effort. Through active participation on the basis of full partnerships, the leaders of the respective organizations can build strong programs to effectively and efficiently reach the common objectives above. In essence, good planning and generation of program at the policy level will provide general guidelines, direction and encouragement needed for program achievement. To provide for this it is agreed to continue jointly the Agricultural Research Policy Advisory Committee (ARPAC). The term "agricultural" is used in the broadest sense, including forestry, other renewable natural resources, and rural life.

I. Objectives of the Committee

- A. To develop recommendations for policy with respect to planning, evaluating, coordinating and supporting unified long-range agricultural research programs and delineating the appropriate areas of responsibility of Federal and State agencies in carrying out these programs.

B. To develop further the bases for cooperation in planning and implementing national, regional and interstate research programs.

Membership

Assistant Secretary for Conservation, Research and Education (Co-chairman)	Designee of the NASULGC upon nomination by Division of Agriculture to-be Co-chairman (4-year term)
Administrator of Agricultural Research Service, USDA	Executive Committee of the National Association of State Universities and Land-Grant Colleges - Division of Agriculture Member (3-year term)
Administrator of Cooperative State Research Service, USDA	
Administrator of APHIS, USDA	Chairman of Experiment Station Committee on Organization and Policy (ESCOP)
Administrator of Extension Service, USDA	
Deputy Chief for Research, Forest Service, USDA	Representative of Association of State Colleges and University Forestry Research organization (ASCUFRO)
Administrator of Statistical Reporting Service, USDA	Four State Agricultural Experiment Station Directors (One for each region with 4-year staggered terms)
Administrator of Economic Research Service, USDA	Representative of the Colleges of 1890 and Tuskegee
Administrator of Farmer Cooperative Service, USDA	Representative of Extension Committee on Organization and Policy (ECOP)
	Representative of Agricultural Research Institute

III. Authority

This committee is authorized by the Secretary of Agriculture and the President, National Association of State Universities and Land-Grant Colleges to undertake and/or sponsor those activities it considers to be appropriate or necessary to the achievement of the objectives as stated in Section I. The normal routes of reporting of the committee shall be to the Office of the Secretary of Agriculture and to the Division of Agriculture, the Executive Committee and Executive Offices of the National Association of State Universities and Land-Grant Colleges.

IV. Subcommittees

There will be a National Agricultural Research Planning Committee (NPC), with adequate staff, under ARPAC specifically to deal with the important planning element of ARPAC's activities. The NPC is to be comprised of the Co-chairmen of ARPAC, the Administrators of ARS, CSRS, ERS, and FS (research), the four Regional Experiment Station Directors, and a representative of ASCUFRO. The National and Regional Agricultural Research Planning System is continued. In addition to working with and through the Regional Planning Committees, the NPC may establish ad hoc work groups. ARPAC may also establish other appropriate work groups as needed and arrange for the appointment of executive officers to expedite its policies and directives and to provide support for itself as well as its subcommittees.

V. Meetings

The committee shall hold at least two regular meetings each year, with special meetings as called by the Co-chairmen. Reimbursement for travel and other official expenses for members will be arranged by the organization they represent.

IV. Effective Date

This memorandum of understanding becomes effective with the affixing of the indicated signatures below and supercedes the previous memorandum of understanding signed in 1969.

Signed:

Earl L. Butz
Secretary, U.S. Department of Agriculture Date: JAN 11 1974

Signed:

Lewis C. Trowdy
President, National Association of State
Universities and Land-Grant Colleges Date: 12-19-73

Mr. DE LA GARZA. Thank you very much, Mr. Secretary.

In keeping with our custom, we would like you to allow the other witness to present his testimony this morning.

If you will remain, we will then open up the table for questions and answers.

Mr. Hightower?

Mr. HIGHTOWER. Mr. Chairman, I am pleased to present to the members of the committee a delegation of agricultural people and farmers. These are farm families from the 13th and 19th districts of Texas, my district and that of Congressman George Mahon.

They are in town today to visit with the committee and to talk to Members of Congress about the private farmer and the problems on commodity prices.

Mr. Chairman, I wanted to acknowledge their presence to the members of the committee.

Mr. DE LA GARZA. We are happy to have you as our guests today.

We welcome you to this Agriculture Committee.

I might say that you have already done some good on your trip. I was on the same plane with you and as soon as you hit Memphis it started raining. They are forecasting rain here today. I hope it follows you back to Texas when you return.

We are happy to have you and I know that Congressman Hightower and the committee will be very happy to meet with you later in the afternoon.

Our next witness is Dr. Sylvan H. Wittwer, director of the Agricultural Experiment Station and assistant dean of agriculture of Michigan State University.

STATEMENT OF DR. SYLVAN H. WITTWER, DIRECTOR, AGRICULTURAL EXPERIMENT STATION AND ASSISTANT DEAN OF AGRICULTURE, MICHIGAN STATE UNIVERSITY; CHAIRMAN OF THE BOARD, AGRICULTURE AND RENEWABLE RESOURCES, NATIONAL ACADEMY OF SCIENCES.

Dr. WITTWER. Mr. Chairman and members of the committee. One could not ask for more favorable circumstances under which to present testimony before a congressional committee. H.R. 11743, which if enacted, would implement into action some of the major recommendations presented in our National Research Council, Board on Agriculture and Renewable Resources (NRC/BARR) report entitled "Enhancement of Food Production for the United States." It was my privilege to serve as chairman of that study.

I will first review and interpret for you what I consider the salient features and recommendations of the NRC/BARR report. This will be followed with my independent appraisal of the present status of agricultural research and what ought to be done about it. I will emphasize what I consider major distortions in policy and priority which have occurred and are now operative in Congress, the White House, the Office of Management and Budget (OMB), and with many federal and state agencies. All have contributed to a mounting national problem.

My remarks will be candid and at times cutting, but hopefully, not abrasive. I report as a spokesman for a National Research Council Committee. It is the only one that deals specifically with agriculture in the entire National Academy of Sciences hierarchy.

I also speak as a director of a State agricultural experiment station.

I was reared on a farm, as devoid of natural resources as any place on earth where man has tried to earn a living. My background is that of an agricultural production scientist. I am not a part of the Federal establishment.

I am mightily disturbed as to national priorities for agricultural research. If food is important, and it is, for a nation that this past year, produced 92 percent of the world's surplus, and had an agricultural export return of over \$23 billion, then it is not reflected by current inputs into agricultural research.

The proposed increases of less than 5 percent in the 1977 executive budget are far from keeping pace, even with inflation, let alone as to any significant options for addressing the high priority areas detailed in our NRC/BARR report.

I ask what kind of a national disaster would it take to put research for our food supply on par, or even close to that currently being expended for Defense, Energy, Space, and Health, Education and Welfare?

The NRC report "Enhancement of Food Production for the United States" as a part of the NAS World Food and Nutrition Study, was produced in record time. Scarcely more than four months were taken for the task. Hundreds of scientists contributed to it. It was delivered to concerned agencies and the White House November 10, 1975, with the intent that it would be used for 1977 budgetary input.

From the beginning, there was strong federal agency participation in the framing of this report. Their representatives helped write it. This is the second unique feature of the study. It should facilitate the implementation of the recommendations therein.

The emphasis on improving food production in the United States is justified. First, the humanitarian—assisting starving people overseas. This has become an American tradition.

Second, it will help reduce current worldwide anxiety and restlessness.

Third, it will help keep food prices more reasonable for everyone.

Finally, it is good business to maintain a favorable balance of payments in international trade.

Our NRC/BARR report is more than a shopping list of agricultural, food and nutrition problems with a request of more funding for everything. It recommends the type and manner of funding and its administration. Resources—land, water, energy, climate and weather, manpower—their utilization, management, and preservation for the United States are underscored. The importance of socio-politico-economic and institutional constraints are repeatedly emphasized but admittedly, not adequately dealt with.

We, accordingly, have recommended "that concerned agencies and organizations mount an effort to appraise research contributions of the social sciences appropriate to the solution of problems involving food production."

U.S. research and technology have developed an agriculture which is capital, management, and energy intensive. There is emphasis on labor-saving technology. This is not what is wanted, however, for the rest of the world. It may not continue to be good for us. Unemployment, inflation, and food needs are global issues. Partial resolution

of these problems should come from food-producing technologies that are labor intensive with production maintained at high levels, and with minimal input of capital, management, and the non-renewable resources of land, water, and energy.

Thus far we have given little attention to developing such technologies. There are also social costs with labor intensive high production agriculture. I can speak on both sides of this issue. I know because I was reared on such a farm.

Never was there a time in the history of mankind when there was greater opportunity for food abundance. The exploitation of that opportunity, however, is highly vulnerable to the uncertain responses of human political institutions. There must be the political will to produce food. The U.S. is becoming increasingly susceptible to this constraint. Also, assuring our food supply is more than production. It involves post-harvest handling and processing, storage, and getting the food where the people are. H.R. 11744 does not address itself to these issues.

I'm sorry, Mr. Chairman and members of the committee, I've diverted from the text. These are things I've added.

The lifeblood of the NRC/BARR report deals with operational strategies for the management of agricultural research in the United States, organizational prerequisites, institutional changes and new approaches for funding.

We recognize that any major new investment in agricultural research for food production, greater dependability of supplies, improved nutrition and more effective utilization of resources must be accompanied by changes in administrative procedures of involved agencies that will guarantee more efficient use of these funds.

There is an urgent need for establishing national goals and policies in agriculture, food, and nutrition research; and for an improved institutional framework for reporting, observing, and managing the wide range of U.S. research activities relating to food. While the major food research efforts are still concentrated—and rightfully so with the USDA and the State agricultural experiment stations—there are now a dozen other Federal agencies involved.

These include, in addition to USDA, the USAID, NSF, USDI, Labor, EPA, FDA, HEW, Commerce, Space, the Defense Department, and the Energy Research and Development Administration.

We have suggested that a National Agricultural Research and Policy Council (NARPC) be established. It would be a means of communication and deliberation among the many agencies and groups concerned with agricultural research.

Details concerning the role and mission of this Council are given in our NRC/BARR report. Some of these have been incorporated by Mr. Wampler of Virginia into his recommendation for the establishment of a National Agricultural Research Policy Committee in H.R. 11744; by Mr. Brown of California into his Agricultural Research Planning and Budget Advisory Committee in H.R. 11609; and by Mr. Sieberling of Ohio in his Food Research and Advisory Committee within the USDA in H.R. 6737. We don't lack for Bills! But, they don't provide money for needed research.

A second recommendation in our NRC/BARR report is that "science and technology be assigned a prominent role within the

structure of the U.S. Department of Agriculture and that research be emphasized as a major mission"—not just a supporting one.

Included in this recommendation is an appointment of a principal scientist and spokesman for agricultural research; someone concerned with agricultural science and technology, and equipped with staff and budgetary support but independent of the research divisions being administered by the office. This would make the USDA the focal point for food-related research. H.R. 11744 generally endorses this recommendation.

A more effective linkage between the USDA and State Agricultural Experiment Stations (SAES), the Colleges of 1890 and the Tuskegee Institute would be encouraged by enhancement of the role of the Cooperative State Research Service, and more aggressive action by the currently constituted Agricultural Research Policy Advisory Committee (ARPAC).

A focal point of the BARR report relates to funding mechanisms and strategies for agricultural, food, and nutrition research. The simple message, after all the rhetoric, is that additional funding is needed in critical areas and for specific purposes—that is if food production is important.

We have recommended that State and Federal support, now totaling about \$½ billion, for research related to agricultural food productivity be increased immediately by 40 percent. This would restore the buying power of the 1960's. A 40 percent increase could be effectively used by current staff and facilities of the USDA and the SAES and by U.S. universities with support from food-related programs of the several other Federal agencies.

It is further recommended that a competitive grants program be initiated and administered by the USDA and other agencies to encourage research in critical areas of food production, stability of supply, and improved nutritive values.

The program should be designed to stimulate needed interdisciplinary approaches—somewhat of a new strategy.

These grants should be of sufficient duration (5 to 10 years) that staff can be recruited, goals set, and missions accomplished. A key to the funding strategy is support of Mission Oriented Basic Research not now funded from existing sources.

If there is one method which comes out in this report, it's that expression—Mission Oriented Basic Research.

Research priorities are explicitly spelled out in the NRC/BARR report. Crop surpluses, political pressures from commodity groups, budgetary reductions—the executive proposal of less than a 5 percent increase for fiscal 1977 is no exception—and emphasis on immediately applicable results have resulted in a formerly substantial basic research effort in the Agricultural Research Service, and the State Agricultural Experiment Stations to virtually disappear.

Fundamental research undergirding food production has languished for two decades in this Nation.

The system is now designed to support research at both ends of the applied-basic research spectrum but not in the middle. This was the stimulus for the Michigan State University Agricultural Experiment Station with its applied mission-oriented background to join forces with the basic research scientists of the Charles F. Kettering Founda-

tion Research Laboratories in Yellow Springs, Ohio in sponsoring an International Conference on Food Crop Productivity October 20-24, 1975 at Boyd Highlands, Mich. The focus was on research relating to six biological process areas that control and limit food crop production.

The entire proceedings of this conference will be published within a month and we will make sure all members of the House Committee on Agriculture and the Committee on Science and Technology receive copies.

I have copies of a 12-page typewritten Executive Summary of the Conference which I would like to have—with your permission, Mr. Chairman—included in the record.

Mr. DE LA GARZA. I am not sure we can incorporate it into the record, but we can allow it to be filed with the papers of this hearing. Then, we will have consultation with the Chairman and we will make that decision.

[Executive Summary of Conference is held in the committee file.]

Dr. WITTWER. Thank you.

As a nation and as an agricultural food and nutritional research community we have been guilty of a gross neglect in the very areas that hold the keys to crop and livestock productivity. This gross error was detailed in a letter dated December 5, 1975, addressed to Dr. Alfred J. Eggers, Jr., Assistant Director for Research Applications of the National Science Foundation.

Copies were sent to Dr. H. Guyford Stever, Director of the National Science Foundation and to Dr. Herbert Carter, Chairman of the National Science Board.

Time constraints prohibit me from giving the details of that 6-page, single-spaced letter, but you have my permission and that of Dr. Eggers to include it in the record.

Mr. DE LA GARZA. The same would apply to that sir.

[Letter from S. H. Wittwer to Dr. Alfred J. Eggers, Jr. is held in the committee file.]

Dr. WITTWER. I call your attention, however, to the three tables attached to the letter directed to Dr. Eggers. The United States is no longer the leader in research on the key biological processes that control crop productivity. I refer to photosynthetic efficiency, biological nitrogen fixation, and unconventional approaches to plant breeding.

Photosynthesis and biological nitrogen fixation are the two most important biochemical processes on earth. One is the source of all carbohydrates and calories consumed by men, and the fossil fuels he is now exploiting. It is very difficult for me to understand whereas, with the billions now directed toward energy research, that bio-conversion of solar energy via the photosynthetic route scarcely receives token attention, and how we can continue to tolerate and justify the meager expenditure of less than \$10 million for the total research investment in this nation on photosynthesis.

The other process, biological nitrogen fixation, provides the raw products for protein synthesis. It fares even worse, with a total investment of less than \$5 million of the entire nation.

Again, if food is important, efforts in photosynthesis, biological N₂ fixation, and unconventional approaches to plant breeding are de-

manding of a Manhattan project. Our resource base can be changed with time and technology. Expanded research efforts in these three areas would literally add to the resources of the earth. These processes are non-polluting; they are renewable; no limits can be ascribed; and the acquired technologies are non-political.

These three mission-oriented basic research areas are interrelated. They are given the highest priority in our NRC/BARR report, in the recent International Food Productivity Conference held at Boyd Highlands, Mich., October 20-24, 1975, and in project proposals to be moved through the Office of Technology Assessment Food Advisory Committee for action by Congress.

We have suggested six additional high priority research programs for immediate consideration in our NRC/BARR report. They are a matter of record and need not be reviewed here.

Other matters disturb me mightily in the agricultural research arena. First, I question the value of these hearings. What's going to be done when we're through and all appears neatly bound in volumes of a congressional record? What has happened as a result of the recent extensive Oversight Hearing on Agricultural Research sponsored by the two subcommittees of the House Committee on Science and Technology, one chaired by Mr. Symington of Missouri and the other by Mr. Thornton of Arkansas? Earlier I participated in hearings on agricultural research sponsored by House Committee on Foreign Affairs.

We already have hundreds of bills relating to agriculture, food and nutrition. Most of them will never see daylight. What is needed is some action somewhere by somebody to get some resources into critical areas relating to agriculture, food, and nutrition research. The priorities have been given. Operational strategies, organizational prerequisites, and institutional changes have been suggested. Where do we go from here?

Second, there are major distortions in the representation, or lack of it, with scientists knowledgeable in agriculture, food, and nutrition research in high council and policy groups dealing with food. I have already emphatically pointed out in previous testimony—June 25, 1975, see *Oversight Hearings on Agricultural Research*—gross deficiencies in agricultural scientist representation in the Research Applications Directorate of the NSP and the National Science Board.

We are a miserable minority within the ranks of the National Academy of Sciences (NAS). A high level decision with the NAS has placed a \$1 million World Food and Nutrition Study with the Commission on International Relations of the National Research Council rather than with the Board on Agriculture and Renewable Resources, where it logically belongs.

January 14, 1976, I appeared before the William O. Baker and Simon Ramo Committees of the White House Advisory Group on Anticipated Advances in Science and Technology. I was there in defense of our NRC/BARR report on Enhancement of Food Production for the United States. There was not a scientist among the group with an up-to-date background in agriculture or food production.

A subcommittee of food and nutrition has since been appointed. Again, there is no one on the subcommittee who is really knowledgeable in agriculture or food production.

The News and Comments section of Science, February 6, 1976, reviewed the 1977 executive budget. Defense, Energy, Space, NIH, and NSF all received honorable mention. Agriculture, Food and Nutrition research were not on the list.

I'm appalled at what I see going on at high policy levels pertinent to agricultural research. I have, in previous testimony, emphasized the second class citizenship associated with agricultural scientists, nationally and worldwide. This has since—December 22, 1975—been confirmed by an NSF report which lists U.S. agricultural scientists at the bottom of the list in annual salaries received of all scientists and engineers in this nation. If you go abroad, it is worse.

Finally, a word of warning to the agricultural research community. Food is now being recognized as a major asset and resource for the Nation. Mention is frequently made of its being a possible instrument for peace in international diplomacy. Never in the history of mankind has one nation had such a monopoly on food! There is now a plethora of reports giving recommendations for needed agricultural, food and nutrition research.

More are yet to come. Those with non-agricultural backgrounds will be prone to take over. There is a growing feeling about this land that agricultural and food research is becoming too important to be left to the agriculturists. There is the perception that the present agricultural research establishment and its organization is obsolete and incapable of meeting today's problems in the food area. Already there are 12 separate federal agencies involved in food research. Meanwhile, agricultural leaders, agricultural research administrators, and agricultural scientists are not where the actions or policies occur; in my opinion; where national food goals are determined; where priorities are set; and research dollars are allocated.

The agricultural research empire has not yet toppled but the foundations are being eroded.

I will conclude on a positive note. Never before in the history of this nation has there been such interest and receptivity in agricultural, food and nutrition research. Our recent record of accomplishments have never been equalled by any nation in the history of all mankind.

The chief executive has now asked the National Academy of Sciences for a program of research and development to insure our food supply and improve the nutrition of our country and all nations. He has asked that priorities be set, specific programs be outlined and needed resources determined.

Never before have concerned agencies, the White House, the Office of Management and Budget, the Office of Technology Assessment [OTA], and Congress evidenced more interest in implementing many of the recommendations in our NRC/BARR Report "Enhancement of Food Production for the United States." They should, because their representatives helped develop them.

Congressional bills that are the focus of these hearings today and tomorrow are good beginnings in putting some of the pieces together. The science committees of the White House are listening.

A subcommittee of the Food Advisory group of OTA is developing an agricultural research proposal.

There is now at least an agricultural scientist within the Advisory Committee on Research Applications Policy of the NSF, and the Office of Science and Technology Policy of the NSF has been most cooperative.

Meager as it may seem to some of us the 1977 executive budget for agricultural research does reflect input from our NRC/BARR report. The increases recommended are for support of mission-oriented basic research to enhance production, stability, and improved nutritive values of our food supply.

Agricultural research is truly at a crossroads. I optimistically believe that we do have sufficiently articulate and effective spokesmen for the message to be heard.

I ask that the table attached to my statement entitled "Some Major Agricultural and Food Data" be entered into the record.

Mr. DE LA GARZA. Without objection, it will become part of the record.

[The table submitted by Dr. Wittwer follows:]

SOME MAJOR AGRICULTURAL AND FOOD DATA,
UNITED STATES 1971-75

Item	1971	1972	1973	1974	1975 (Est.)
Set Aside Land (10^6 acres)	37	62	20	0	0
Grain Stocks (10^6 metric Tons)	51	69	42	27	23
Agricultural Exports (10^9 \$)	8.5	13	21	22	23
Prices paid by farmers for nitrogen (¢/lb.)	4.8	4.9	5.4	11.2	16.2
Yields of Corn (\$/bu.)	88	97	91	71	86
Milk production per cow (10^3 pounds)	10.0	10.2	10.1	10.3	10.4
Price of Corn (\$/bu.)	1.00	1.57	2.55	2.95	2.45
Price of Wheat (\$/bu.)	1.60	1.76	4.00	4.04	3.72
Price of Soybeans (\$/bu.)	3.03	4.37	5.68	6.50	5.32
Price of Sugar, U.S. raw duty paid equivalent, N.Y. (¢/lb.)	8.5	9.1	10.3	29.5	22.4
Wholesale price index of fuels and related products and power (1967=100)	114	119	134	208	245
Income for food (%)	15.7	15.4	15.9	16.8	16.8
Enrollments, colleges of Agriculture (10^3 students)	60	65	73	82	91
Gross agricultural income (10^9 \$)	61	70	95	101	102

Federal Funding of Agricultural Food and Nutrition Research

Cooperative State Research Service (payments to States)	60	63	67	68	85
Agricultural Research Service	179	192	208	205	224

Mr. DE LA GARZA. Thank you very much for your excellent, and needless to say your quite frank statement.

We invite you to remain where you are and ask Secretary Long to join you at the witness table for any questions from the committee.

Mr. Wampler, you are invited to sit there or remain here at the bench as you see fit.

If there are questions for Mr. Wampler, then please direct them to him.

Mr. Poage?

Mr. POAGE. I have no questions.

Mr. DE LA GARZA. Mr. Jones?

Mr. Jones of Tennessee. Thank you very much.

I would like to take this opportunity to congratulate Mr. Wampler, our colleague, for his statement regarding this bill. I am co-sponsor of it.

Mr. Wampler, I want to commend you for your fine testimony and the belief that you have in the bill. I believe there are some corrections which are necessary. I think this committee needs to consider it very seriously.

No doubt we will need some additional changes in the legislation as we move on with hearings.

I want to congratulate you for having the interest and foresight to put this together.

Thank you, Mr. Chairman.

Mr. DE LA GARZA. Mr. Richmond?

Mr. RICHMOND. Dr. Wittwer, I wonder whether or not you might amplify a bit your feelings on research in human nutrition?

As you know, the Department of Agriculture has a total research budget which is mainly spent on animal research and agriculture research and only 2 percent is spent on nutrition research.

How do you feel about this?

Dr. WITTWER. We have strong recommendations in our report. Personally, my response to this is this.

We cannot speak of separate components. We have emphatically pointed out in our testimony this morning that agricultural food and nutrition research is together. We have emphasized also that is important that we recognize production research, stability of supplies, and improved nutritive values.

One of the really great opportunities and options for acquiring rather quick results in terms of research investments is to enhance by genetic and other means the nutritive values of the conventional food commodities or crops that we now have.

A great deal of progress has been made.

It is a very high priority and one would get quick results from the research investment. It would have a tremendous impact in raising the nutritional levels and well-being of hundreds of millions of people.

This would be the case worldwide and here in the United States.

Mr. RICHMOND. Secretary Long, I believe last week we heard testimony indicating that you favored a reduction in the nutrition education budget for this year.

I believe that the budget is to be reduced by \$10 million. Secretary Feltner said it was your department.

Mr. LONG. The Extension Service's budget, yes.

Mr. RICHMOND. Taking into account the small percentage spent on human research, and the rather small effort made at nutrition education, why do you have this position of going for a reduction in the Extension Service rather than in increase?

Mr. LONG. The position of the Department has been in regard to the expanded food and nutrition program of the Extension Service that it is an applied program, not a research program.

The extent of the effort that has gone on now for a good many years has reached a point where we felt maybe we could reduce the pilot program and redirect some of those funds into other areas. It was a budgetary decision and not a question of some other program itself.

Mr. RICHMOND. In other words, you feel that the American people are sufficiently aware of nutritional values so that USDA can afford to cut the program?

Mr. LONG. No, I don't think it is possible for us to reach the levels of all areas of economic income and family arrangements for all of them to have a precise understanding of the nutritional value of food.

We are attempting to reach a target group in this particular program which is much narrower.

We know from evidence that has been presented in other reports that some of the nutritional problems in the higher income groups are at least as great as those in the lower income groups. So, we don't attempt in this particular program to reach all levels. We couldn't possibly reach that desirable status with this program.

Mr. RICHMOND. Mr. Secretary, I would urge you to reconsider your planned reduction of nutrition education.

Four departments have an obligation to provide nutrition education for the American public, particularly the low-income public.

The American public, for example, buys Pringles. As you and I know, Pringles cost 57 cents a can and contain only 3 ounces of potatoes. The can costs more than the potatoes are worth, and the nutritive value of those 3 ounces of rehydrated potatoes is minimal.

Let's take breakfast foods in general, for example. They don't do the job that they attempt to do. Many of them, even the so-called "natural" cereals, contain high amounts of sugar and other chemicals.

Don't you think that our USDA has some obligation and an opportunity through its Food and Nutrition Service to help improve the American diet?

Mr. LONG. Indeed it does.

However, the Food and Nutrition Service is a different agency within the Department.

Mr. RICHMOND. It operates out of your Extension Service?

Mr. LONG. No, it does not.

It's a separate agency. It conducts the food stamp programs, school lunch, and other programs of that nature.

What I think you referred to earlier was the expanded food nutrition program of the Extension Service.

Let me add one other thing. The expanded food and nutrition program is not by any means the limit of the Department's efforts in the area of nutrition and nutrition education. There are major programs within the Extension Service over and beyond that which

cover a much broader spectrum of the population and have been operating for many, many years.

One of the important elements of the program is to improve the knowledge of nutrition within the general public.

I think they've been doing a very good job considering the resources that have been assigned to them.

Mr. RICHMOND. Thank you, Mr. Chairman.

Mr. DE LA GARZA. Mr. Wampler?

Mr. WAMPLER. Mr. Long, I apologize for not knowing, but do you have an agricultural research background?

Mr. LONG. I have an agricultural management business background.

Do you mean by "agricultural research background" do I have a doctor's degree?

Mr. WAMPLER. Do you have scientific expertise?

Mr. LONG. I've been in agricultural research all of my life as a user, as an advisor, and as a part of the system as applied in California before coming to Washington.

Mr. WAMPLER. It is true then that you have somewhat of a banking background, do you not?

Mr. LONG. A six-year period, yes.

Mr. WAMPLER. Was that in agribusiness?

Mr. LONG. Yes.

Mr. WAMPLER. Is it true, generally speaking, that research activities in the Department of Agriculture require two Assistant Secretaries?

Mr. LONG. No.

Mr. WAMPLER. More than two?

Mr. LONG. There is only one Assistant Secretary that has the responsibility for research.

We do have economic research under the Director of Economics, Dr. Paarlberg.

Mr. WAMPLER. I want to thank you for coming this morning and for presenting your statement. Unfortunately, I did not have the opportunity to see your statement before this morning.

I must say that I am disappointed in your recommendations and your opposition to this legislation.

I think among other things it represents an inherent lack of sensitivity to priorities in agriculture.

It would seem to me that in looking at the budget for the Department of Agriculture in the last couple of years it has become more the ministry of food than what we think of as the classical USDA, that is to look after the interests of farmers.

I'm not objecting to nutritional programs because basically I have supported them.

But, it seems to me from reading your statement that most of your objections to the bill which is before us today is somewhat of a bureaucratic reaction to the Congress saying that we think that agriculture research should be one of the primary missions of the Department of Agriculture.

I recognize under the separation of power that the Executive Branch has certain rights and privileges and authorities just as I feel we in the Congress do.

We are elected by the people. The House of Representatives is the people's voice. We were sent here to write laws and do what we think is right in the best interests of the American people.

I'm going to ask you this question. Inasmuch as your prime objection to the bill seems to stem from the position that the Congress should not direct the Secretary of Agriculture to appoint an Assistant Secretary for agriculture research, then would you or the administration entertain a modification of this bill and authorize the Secretary to appoint one additional Secretary without designating his title with clear understanding that the Secretary would utilize this new position to reorganize the lines of authority in the Department to give this new Assistant Secretary the prime responsibility for agricultural research as envisioned in the bill?

Mr. LONG. You are asking me to respond for the Secretary. Our argument in this issue is not opposing research.

I will disagree with you in terms of your mentioning lack of sensitivity.

But, beyond that the Secretary and future Secretaries should have the prerogative to arrange their programs and their emphasis and authorities within the Department as they see fit to carry out the responsibilities that have been delegated to them by Congress. They object to having that specific designation.

We would agree and have a bill request in to the Congress for additional Assistant Secretary for the Department. Whether he would designate specifically and limit to research is a question in my mind. I think he would not because I don't believe it would be sound administration.

As far as further emphasis on research and an increase in the mission orientation of the Department, I would like to think that we are that way now.

It could be that an emphasis within the Department in terms of additional recognition of research as a mission in its own right could be argued and maybe favorably.

Mr. WAMPLER. Mr. Long, let me say this in conclusion.

I cannot agree with you that the President's proposed budget for 1977 recognizes the important mission of agriculture research in this country.

It falls far short of those goals. I think Dr. Wittwer's testimony and others who have testified before the Congress have pointed that out clearly.

I realize that reasonable men and women can differ on a section of priorities as it relates to a budget of almost \$400 billion in expenditures of the taxpayers' dollars, but I would hope that the Secretary and this Administration would go back and carefully review their position on this legislation because in my judgment the best use of the amount of money that we have asked for by way of increased authorization will pay dividends many, many fold.

Reasonable men and women can differ as to where these priorities lie, but I find in my judgment, and I think I speak basically for American agriculture, that the priorities and the assessment of appropriations and requested appropriations for research in this budget are wholly lacking. I hope you'll go back and review that because this Committee is going to make some recommendations in this regard under the new budgetary processes in the House. I think you are going to hear from them in some pretty clear and convincing language.

Mr. LONG. Mr. Wampler, let me make this further comment.

Essentially there is no disagreement between us on the purposes of your bill in terms of enhancing the research capabilities for agriculture in this country. There is no great difference between the testimony which has been presented here representing the Department. The essential difference is how we carry it out.

We basically disagree with the bill's proposal in terms of the reorganization of the Department that it will bring more effective and meaningful research from the Federal system to the agricultural community and to the consumers in general. We simply disagree.

Mr. WAMPLER. It is true that there is apparently a very great difference in the assessment of priorities in the commitment of resources to carry out this issue, is that correct?

Mr. LONG. I don't believe so.

I heard a lot about the Barr Report this morning. I studied it. We support it. We had people working on it. There is very little difference between that report, the one that came out of Kansas City and others in terms of priorities.

We've spent a great deal of time and effort and money on trying to get this sorted out and try to go in the direction where the greatest need is.

I heard a lot about this and most of the inference was that we weren't doing anything. Of course, I naturally resent that. I know it's not true.

Mr. WAMPLER. In other words, you are satisfied with the request for appropriations in the present budget for fiscal year 1977 as it relates to agriculture research, is that correct?

Mr. LONG. Mr. Wampler, there is no way that I could sit here and say that I felt it did the job that we needed to do.

Mr. WAMPLER. That's what I wanted to hear you say.

Mr. LONG. I do think we have to make budget priorities. That is the Secretary's responsibility.

Mr. WAMPLER. Thank you very much.

Mr. DE LA GARZA. Mr. Jenrette?

Mr. JENRETTE. Mr. Long, how long have you been with the Department?

Mr. LONG. A little over three years.

Mr. JENRETTE. On page two you refer to the computerized current research system.

Would you give me briefly exactly how that works?

Mr. LONG. It's a system that is set up to record in as brief a way as possible all the research activity that is undertaken by the Department of Agriculture, the university system and others who are contributing to this inventory system of current research activity going on in the country.

Here is a little booklet. I don't know whether it would be helpful or not, but I could leave it for you if you would like.

Mr. JENRETTE. Is this put in the computer after the research has been commenced?

At what point in time is the research computerized?

Mr. LONG. At the moment it is an inventory system. It's logged once the research project is undertaken. We hope for it to do more than that.

This condition has not been true until recently. Until we had a system like this, we didn't know except for the limited communication system what we had available at any one time. Now at least we have some knowledge as to what is going on and what we need to do in order to meet priorities as established by research administration, by the policy committees, and by the community that we serve.

Mr. JENRETTE. What percentage of duplication have you found in these agencies that you support?

Mr. LONG. Percentage of what?

Mr. JENRETTE. Duplication of projects in research.

Mr. LONG. I've heard that comment before. I read the Pound Report which came out of the Academy of Science. I read the Barr Report.

There is inference of excessive duplication.

I have not found that to be true.

There is replication.

That we find is not all that bad. The problem is that we don't have enough money to go around to all the things we need to do. We have attempted to reduce even replication to a point where it is at least at a minimum.

But, substantial duplication I do not think can be verified in fact. When someone can do so, I'd like to know about it. That's one of my jobs and one of the jobs of the administrators of the university systems—to minimize this duplication as much as possible.

We do accept replication.

Mr. JENRETTE. Don't you think this bill as proposed would give you the tools in the Department to assure that duplication if there is any, would be cut to a minimum?

Mr. LONG. No, sir.

It would not help us at all.

I wish it were the case. If so, I would be glad to support it. I don't see any administrative process in the bill which would help us in our present problems in administrating research nationally in the national interest.

Mr. JENRETTE. Let me move over to page 3.

You said, "But it can work better. And must work better if the challenges of the future are to be met."

What do you propose to do to see that the challenges are met?

Mr. LONG. The best we can do if we are limited in resources, and we must admit we are, is that we will have to use our resources in the most effective way we know how.

That comes through planning. We put an extensive effort into planning in terms of organizing our research to minimize the excess, in terms of duplication which you just brought up, to effectively direct our resources in those directions which are most important for us to be working on, do our best to sort out the national priorities and give the States an opportunity to cover local and regional needs as they arise.

We must recognize both elements in our two-tier system of research.

Mr. JENRETTE. That's what you propose to do. Is this currently being done?

Mr. LONG. We are doing it.

Mr. JENRETTE. Let me go into the grants on page seven of your testimony.

You stated that the Department has the authority but that according to the budgetary requests, even with the authority, you are doing very little to provide these agencies with grants to do the research.

The authority without implementation of the authority is no good for us in providing the research.

Mr. LONG. This is another means of getting the funds into the hands of research agencies wherever they may be:

The categorical grant, the specific grant, the special grant. We don't argue the point of whether grants should exist or not. The only problem we have is how much money we do have available for it.

We do support the institutional system strongly through the Hatch Act.

I don't believe any of the testimonies presented here today suggest that that should not be continued, or that something else be substituted for it. Although, those suggestions have been made in the past.

This is in addition to. We don't argue the question if the funds could be made available. I would be personally delighted if they were.

Mr. JENRETTE. Of the research facilities that you mentioned in your testimony, have you or your top assistants visited any of those? Are you familiar with them or are you just familiar with it on paper?

Mr. LONG. You mean the research stations and field stations?

Mr. JENRETTE. Yes.

Mr. LONG. I've visited about half of them. Some day I will get to all of them. I visited all of the major research centers conducted under the USDA auspices.

Mr. JENRETTE. I see my time us up. but I would like to say this. On page 7 there is a very interesting statement, "We need the support, not new legislation."

I would say, as one of the co-sponsors of the bill, that I believe you have had the support but obviously you have seen it as unilateral.

I think with 26 members of all political philosophies having endorsed this bill, I think that probably through the full range of our political philosophies, that we feel the support that Congress has given has not been utilized and we want to make it a bilateral, rather than unilateral, situation between Congress and the Department.

I would like for you, as my friend Mr. Wampler said, to reconsider your position.

I think this legislation can be meaningful and beneficial to the future of agriculture and I certainly hope it becomes law.

I compliment my friend from Virginia for bringing this up.

Mr. DE LA GARZA. Mr. Harkin.

Mr. HARKIN. Thank you very much, Mr. Chairman.

I am certain that those of us who did not co-sponsor the bill are nonetheless very adamant in our support of agriculture research.

I happen to have a land-grant college in the district which I represent. We also have a research station.

But, I guess I'm concerned that perhaps in our zeal to make sure that agricultural research continues, and to make sure that adequate funding is provided for agricultural research, and to make certain that we do address some of the problems of the future for better

nutrition and better food production to meet the increased number of people, we don't begin to dilute our efforts. Perhaps I see it in that light.

Take for example the establishment of this Advisory Committee.

I'm sorry I was not here for your testimony. I notice you did make some mention of ARPAC of which you are co-chairman.

I'm wondering why ARPAC cannot provide an advisory committee rather than set up a new one under a new piece of legislation.

Have you addressed this?

Mr. LONG. Yes. Let me briefly comment.

We are not opposing the idea of a broadened committee.

ARPAC does not have broad enough representation to include all of the Federal system. It includes the Department of Agriculture. It includes the university and land-grant institutions and the private sector.

We are not objecting to an increase in coverage. We are not entirely sure what it would do for us because the alternative is to go through the Federal Council of Science and Technology which we think is now going to be able to give that additional coordination which we have not had in the past.

It's another way of doing it but there is no disagreement in terms of a plan to broaden the scope to make sure we cover the total effort.

Mr. HARKIN. Perhaps I don't understand.

What do you envision in the new advisory committee that would not or could not be done by ARPAC?

Mr. LONG. I have argued earlier that it is not necessary. It would be duplicating the present system as it stands.

I would not argue that statutory recognition of such an advisory committee would be helpful.

Mr. HARKIN. Fine. Then let's statutorily recognize ARPAC.

Mr. LONG. That's possible to do and you may ask for it to be broadened somewhat.

Mr. HARKIN. At least it's already in place. It has been well-established for some time.

Mr. LONG. Yes, for a long time.

Mr. HARKIN. It would seem to me we could draw upon their expertise and advice.

Second, I'm a little concerned about this proposal which I do not think is in the present bill under consideration but I think will be brought up.

I apologize if it was discussed earlier today.

I'm talking about annual authorization for some of the ongoing research projects.

I guess I'm a little concerned about that inasmuch as many of these projects require several years.

I'm just wondering what kind of disruption that would have in the agricultural-scientific community if we would now begin to look at the authorizations on an annual basis rather than on a continuing basis?

Mr. LONG. There is some concern in terms of the long term multi-year projects.

I am sure a system will have to be worked out so that there will be complete understanding on those projects authorized for more than one year.

It's probably not appropriate for me to comment on the authorizing and/or appropriations process within the Congress, but I think it is a very healthy thing for research to look into it as often as you can.

Mr. HARKIN. I think we ought to every year have before this Committee ARPAC or the National Association of Land-Grant Colleges, for example, to tell us with what they are involved and what they are doing.

That is somewhat different than going to an annual authorization type of system.

Mr. LONG. I understand.

Mr. HARKIN. Mr. Chairman, I thank you very much. That's all I have.

Mr. DE LA GARZA. Mr. Bedell.

Mr. BEDELL. Mr. Long, how many Undersecretaries of Agriculture are there now?

Mr. LONG. There is one Undersecretary.

Mr. BEDELL. Of Agriculture?

Mr. LONG. Yes.

Mr. BEDELL. If we were to add another Undersecretary for the purpose of research—I'm talking about an Assistant Secretary. That is, how many Assistant Secretaries are there?

Mr. LONG. There are five.

Mr. BEDELL. Are each of their duties clearly defined and delegated so that they know what they are responsible for?

Mr. LONG. Yes, they are.

Mr. BEDELL. If we were to add one more and if it were up to the Secretary, what would he define those responsibilities as, do you know?

Mr. LONG. The present request of the Administration for an additional Assistant Secretary, as I understand it, would be to cover the broad coverage of agricultural economics for international and domestic.

Whether they would limit it to that specification, I don't know.

Mr. BEDELL. Apparently it is his opinion that agriculture research would not rate as one of the seven Priority areas in terms of agriculture policy, I assume, is that a correct assumption?

Mr. LONG. That is correct. It would not be simply identified, in that agricultural research is so intimately associated with much of the Department's activity.

Mr. BEDELL. Whose responsibility do you think it should be in the Government to determine where the priorities are and whether we feel that agriculture research should be one of the six priority items in terms of agriculture.

Do you think it ought to be up to the Congress or up to the Secretary of Agriculture?

Mr. LONG. There is no question that Congress has broad policy guidance responsibilities and that Congress can emphasize, I'm sure, in one way or another if it chooses.

As we see it at the moment the way it is currently structured it is a major mission.

There is some indication around here in Congress that it is not, but I disagree. It is a major mission.

Mr. BEDELL. If the Congress were to determine in its judgment that agricultural research should be one of the seven top priority items in agriculture, then do you disagree with the fact that Congress should determine that therefore we should delegate that responsibility within the Department of Agriculture to one individual where that is his duty and responsibility?

Mr. LONG. Yes; I do disagree.

I think you have given to the Secretary of Agriculture that responsibility.

You may direct him in any way you choose but I would say you should not tell him how to structure his job to carry out the responsibility you have given him.

Mr. BEDELL. If that is the case and if Congress determined that that should be one of the seven priority items then if as you have already indicated the Secretary does not consider it to be, then how would you go about trying to see that that change was made in terms of priorities within the Department of Agriculture if you were in the Congress?

Mr. LONG. If I were a member of Congress and felt it would help, I would do everything I could to urge the Secretary one way or the other.

Mr. BEDELL. If you thought it would not help what would you do?

Mr. LONG. I would do nothing.

Mr. BEDELL. I guess that's where you and I disagree. I think we are charged with a duty and responsibility by the people who elected us to see that proper priorities are established. It seems to me that it's up to us to try to see what we can do. I disagree strongly about the management practices.

I came out of a management background.

It seems to me if you are going to accomplish a purpose then you have to clearly define and delegate the responsibility for that purpose to some particular individual and hold them accountable.

Mr. LONG. I am currently held accountable and responsible for research in the Department right now.

Mr. BEDELL. It is now at a lower level of priority than one of the seven top priority items which we have agreed to, have we not?

Mr. LONG. I have not agreed.

Mr. BEDELL. I thought you said the Secretary did not consider this one of his seven top priority items or else he would have assigned it to an Assistant Secretary.

Mr. LONG. The other Assistant Secretaries are not so organized. They are organized along disciplinary areas of activity.

Mr. BEDELL. If they have more than one responsibility then this is lower than seven.

Mr. LONG. They all have responsibilities.

Mr. BEDELL. My time has pretty well expired.

I have one question.

You said that in the food and nutritional educational program you are only trying to get one segment of our society.

What segment of the society is that?

Mr. LONG. The expanded food and nutrition program as conducted by the Extension Service is directed toward the low income families.

Mr. BEDELL. So the middle income or upper lower income families are not being directed at.

The budgetary requirements prevent that, is that correct?

Mr. LONG. No, the effort of the Extension Service to the other economic and social areas is in their broad program on nutrition education. It's not a specific target area.

Mr. BEDELL. I yield back the balance of my time.

Mr. DE LA GARZA. Mr. Grassley.

Mr. GRASSLEY. On page 6 of your testimony you suggest in the first paragraph that the Secretary of Agriculture and the President of the National Association of State Universities and Land Grant Colleges would respectfully designate the cochairman and the individuals to fill individual membership slots. What is your reasoning for sharing that responsibility on the one hand with a non-appointed, non-public official and on the other hand with the Secretary of Agriculture who is a public official?

Mr. LONG. We share the research responsibility through the Hatch Act for the agricultural research program in this country where, incidentally, almost all of it is conducted.

So, it would seem only fair to us that the university system as it participates in the research program share with us in a policy-development, program-development issues.

Mr. GRASSLEY. What about from the standpoint of public funds at the Federal level being administered by the Secretary of Agriculture.

Wouldn't that be the way to see that Federal funds be administered according to public policy and would that not dictate that the people, that is the membership on the council or the policy committee, would be appointed by a public official representing the public at large as opposed to the aspect that the public might not be represented when appointed by the President or the Land Grant Association?

Mr. LONG. The president of the Land Grant Association appoints only those members which represent the association.

The Secretary appoints the balance.

We feel it is an advisory body and therefore it is merely advisory to the Secretary.

Mr. GRASSLEY. This brings me to my point I wanted to ask about. The makeup of the committee as pointed out in the bill which we have before us.

You suggest it should be done this way.

Why, then is the method of appointment detailed in the bill so bad, in your opinion?

Mr. LONG. We would recommend that ARPAC would be used as the basic mechanism and broaden it to accomplish the purpose of the bill in that method rather than an entirely new committee.

Mr. GRASSLEY. Would you tell me then what specifically is wrong with the makeup of the committee as we designate it in the bill?

Mr. LONG. Fifteen people, I think, is proposed. I think when you get to 15 people you reach a forum. You do not have a functioning committee level.

You could argue that point as to what is the right number.

I think the point of the proposal in the bill is to broaden its representation and increase the coordination which might be provided by such a committee within the Federal system.

Mr. GRASSLEY. Do you see anything wrong with the basis of selecting people like from the National Science Foundation, the Office of Technology Assessment and the Environmental Protection Agency? Is this what you are finding fault with?

Mr. LONG. No.

I do not find fault with that. I'm trying to suggest this. We have an existing mechanism. Let's take a look at it. If it is inadequate then let's broaden it to increase the scope of the agricultural research activity so it includes other agencies like HEW and so forth.

They have major research programs. We agree with that.

I thought we could accomplish this purpose through the Federal Council of Science and Technology, through its Food Committee. All members of the Federal system are members of this council.

By that means we could then relate back to the ARPAC program to make sure that we were coordinating.

I understand the purpose of the bill is to increase the scope and coverage.

Mr. GRASSLEY. Do you feel that the makeup of the committee as suggested in the bill as opposed to your suggestion of building on ARPAC and using that as a basis is that it is too subject to governmental control?

Mr. LONG. No.

I don't think that thought occurred to me.

Mr. GRASSLEY. I'm not implying that it did.

But, I want to know if that may be part of it. Could there be a feeling that ARPAC's leadership in this area may be challenged as the result of the passage of this bill?

Mr. LONG. I heard somebody comment as to whether or not this was bureaucratic.

I don't have a bureaucratic background, and I'm not going to have this responsibility very much longer. I'm trying to think about the most efficient way to get the job done.

I do not object to a national agricultural advisory research committee. I don't object to it, but I point out that there is one in place now.

Why don't we use it and improve it? That's the substance of my testimony.

Mr. GRASSLEY. Thank you very much.

Mr. DE LA GARZA. Mr. Wampler has one further comment.

Mr. WAMPLER. Mr. Long, is it not a fact that the present position of the Assistant Secretary of Agriculture for Rural Development is basically the result of the initiative of Congress?

Mr. LONG. That is correct.

Mr. WAMPLER. Do you find fault with that?

Mr. LONG. I suppose it would be inappropriate for me at this hearing to comment on that particular element.

If you are asking my personal opinion, I think it was a mistake.

Mr. WAMPLER. It is being implemented as a mistake. I was talking about the position itself. The Congress does have a right, legally, constitutionally, and morally, to direct the Secretary of Agriculture

or any other officer of the Executive Branch to carry out what we think is sound public policy and to direct him to do it.

Mr. LONG. My testimony shouldn't indicate that you do not.

Mr. WAMPLER. I assure you that to the extent that the gentlemen from Virginia can influence it we are going to direct you to do it and I hope that you will.

I have one other thing.

You indicate that you object to the committee as proposed in the bill.

Would you not agree that the present members of the Agricultural Research Policy Advisory Committee or ARPAC would be likely candidates to serve on the newly proposed agricultural research policy committee?

Mr. LONG. I do not know; I presume some of them would.

Mr. WAMPLER. Do you object to consumers having representation?

Mr. LONG. No.

Mr. WAMPLER. Do you have any consumers on there now?

Mr. LONG. We do not.

Mr. WAMPLER. Why not?

Mr. LONG. I suppose it was originally started with the idea of this, "Let's see if we can't coordinate more effectively the policy and planning of researches conducted by the university land-grant system and the Department of Agriculture." It started there.

It was not to exclude others but it was an attempt to bring these groups together to be more effective in carrying out their programs.

Subsequently it has been modified to include the private sector.

We have invited in observers but we do not have the authority to include other members of the Federal system. There are not specific consumers. When we go to the consumer program, and maybe we should, then I would hope that we will have to go through the complete process of freedom of information and so forth dealing with our committees. It's a lengthy process.

We would do that if it were called for.

Up until now we had felt that our main purpose was an attempt to work on determining where most of the research is conducted.

That is not all of it. Therefore, the concern has been growing about it being important in other areas and be coordinated on a broader base.

Whether we are going to open it up and make it a forum where consumers and other interests, whomever they may be, may also come into this policy body than that is a matter of future determination.

It has not been the case in the past.

Mr. WAMPLER. May I respectfully suggest that in all advisory committees that you have in the Department if you broaden the base and get greater input then it might make it easier for those of us in Congress to get increased appropriations for you.

It might be helpful.

I think you ought to give it serious consideration.

Mr. LONG. We are not ignoring it.

The Kansas City Conference which was held mid last year was an effort by ARPAC to include the broad consumer group. They sat down with the scientists and with the administrators and thought about the priorities of research and gave it a very effective effort in my opinion.

It was a broadly composed user group, as well as the scientists. They were brought together in one place.

That's one way to carry out our responsibility for public participation.

Mr. WAMPLER. Dr. Wittwer, the fact that we have not interrogated you as much as we did Mr. Long this morning is not indicative of our lack of appreciation for your continued interest in this issue.

We appreciate your being here, Dr. Wittwer.

Dr. WITTWER. Thank you.

Mr. DE LA GARZA. We thank you very much for being here, gentlemen. We will recess until 2 p.m.

[Whereupon, at 12 noon the hearing was recessed.]

AFTERNOON SESSION

The CHAIRMAN. Good afternoon. The Committee on Agriculture will come to order.

The committee meets to continue the hearings begun this morning on H.R. 11743, the National Agricultural Research Policy Act of 1976, and related bills, by Mr. Wampler and others.

The first witness scheduled for this afternoon is Dr. Fred D. Maurer of the Institute of Tropical Veterinary Medicine of Texas A. & M. University, who is representing the American Veterinary Medical Association. Dr. Maurer.

STATEMENT OF DR. FRED D. MAURER, INSTITUTE OF TROPICAL VETERINARY MEDICINE, TEXAS A. & M. UNIVERSITY, REPRESENTING AMERICAN VETERINARY MEDICAL ASSOCIATION

Dr. MAURER. Mr. Chairman and members of the committee, the American Veterinary Medical Association appreciates this opportunity to comment in support of the establishment of a National Agricultural Research Policy as proposed by H.R. 11743 and 11744.

The agricultural research activities with which the veterinary medical profession has primary concern, animal health, are inadequate to solve current and future problems. This situation has resulted from continuing insufficient financial support.

Livestock and poultry diseases are serious problems in agriculture and food production. Losses of about \$3.6 billion, equivalent to more than 10 percent of the annual income from the animal industries, must be absorbed by consumers in the prices paid for meat, poultry, eggs, and dairy products. These foods are vital to good nutrition. Unless more is done to solve animal disease problems, they will continue to add to food costs and limit food supplies.

The dairy cow efficiently converts forage to food for man, and milk is one of our least expensive sources of animal protein. In the United States, milk supplies 23.6 percent of our food protein, 12.5 percent of our energy, 76.7 percent and 38.1 percent of our calcium and phosphorus, respectively, 44.5 percent of our riboflavin and important percentages of other food needs.

Dairymen in the United States own 12.3 million cows, conservatively valued at \$500 each. Thus, \$6.2 billion is invested directly in dairy cows and \$6 to \$12 billion is invested in land, buildings, and equipment. Capital investment in dairy farms ranges from \$12 to \$20 billion exclusive of distribution, manufacturing, and ancillary businesses.

Regrettably, this huge investment is inadequately protected against disease. Major portions of the funds available to the U.S. Department of Agriculture (USDA) for dairy health research are spent for knowledge and protection against exotic diseases, such as foot-and-mouth disease.

With the exception of certain catastrophic and exotic diseases, most of the expenditures on dairy cattle disease in the last 40 years have been directed toward control of brucellosis and tuberculosis, which have a direct public health impact. It is time now to exert a significant effort against those diseases which cripple America's dairy industry such as mastitis, infertility, and enteric diseases of calves.

The beef industry is a major segment of the agricultural economy of the nation. Beef sales were 28.2 percent of the total case receipts on farms in 1970 and are estimated at 30 percent in 1972.

Beef production is a way of economic life for many rural Americans, and processing and marketing provide thousands of jobs and dollars for the economy of every State. Cattle convert grain and roughage into a highly desirable protein often on land that has little value for any other use.

The beef industry has experienced great expansion with the past few years. American cattlemen have realized that enormous losses can result from diseases. Beef producers, veterinary practitioners, pharmaceutic and biological product manufacturers, and scientists have worked together to reduce these losses and to protect the public's health. The present low levels of brucellosis, tuberculosis, contagious bovine pleuropneumonia, anthrax, and many other diseases indicate the success of these animal disease programs. However, diseases such as enteric infections, respiratory infections, and infertility still cost the industry approximately \$1 billion annually. Today, beef cattle are produced in great concentrations and are frequently transported over great distances, providing many opportunities for exposure to disease. Disease still represents the greatest single hazard to the efficient production of an adequate and wholesome supply of beef protein.

Between 90 and 100 million swine are marketed annually in the United States. The direct cash income from this market amounts to \$5.5 billion annually. The swine industry generates an additional yearly agribusiness income of at least \$4.5 billion. In areas of maximum production such as Iowa, swine production is the major income-generating industry.

The economic impact of diseases on the swine industry is difficult to determine, but estimates by swine specialists at Iowa State University of the cost to the Iowa swine industry give some indication. Iowa produces 20 percent of the Nation's swine.

Disease	Loss to Iowa
Coliform and viral diarrhea	\$45,000,000
Atrophic rhinitis	22,500,000
Pneumonia	42,000,000
Arthritis	12,140,000
Reproductive failure	19,000,000
Swine dysentery	10,000,000
Internal parasitism	5,000,000
Total	155,640,000

These estimates indicate that diseases cause a yearly loss to the nation's swine industry of about \$800 million, nearly 20 percent of the direct gross income from that industry.

The poultry industry in the United States has expanded tremendously in this century. By 1970, the gross income to the producers of eggs, broilers, chickens other than broilers, and turkeys exceeded \$4.2 billion. Eggs grossed \$2.2 billion (51 percent) broiler income reached \$1.5 billion (34 percent), chickens other than broilers, \$107 million (3 percent), and turkeys \$492 million (12 percent). The per capita consumption of broilers in 1960 was 10.5 kg. By 1970 consumption increased to 16.8 kg. The poultry industry is so thoroughly integrated with allied industries that its contribution to the total gross national product is difficult to measure. The \$4.2 billion in gross income is nearly one-tenth of the gross income from all farm commodities.

Over the past 20 years, poultry research, measured by cost-benefit ratios, has been most productive. Development of a successful vaccine for immunization against Marek's disease, a leukemia-like disease of chickens, is an example. When it becomes practical to vaccinate all broilers, this vaccine alone will add as many as 5 percent more broilers to our total meat supply by reducing mortality rates and condemnations.

Viral diseases, including infectious bronchitis, Newcastle disease, influenza A, and laryngotracheitis, cause significant losses. In addition, fowlpox, infectious bursal disease, and avian encephalomyelitis are widespread. Certain of these infections may predispose disease by other infectious agents. The factors which affect their occurrence and spread must be carefully studied to develop improved methods of control.

Coccidiosis, clinical and subclinical, continues to be a major deterrent to efficient production of poultry meat and eggs. After prolonged usage, many coccidiostats become ineffective because resistant strains of coccidia develop or because of changes in environment and management. Coccidiosis in commercial layers and breeders results in unthrifty birds, excessive culling, deaths, and decreased egg production. More effective control measures are needed to achieve maximum performance.

Internal parasites often cause heavy losses in poultry flocks, but more commonly they cause chronic insidious losses by preventing maximum productivity. Continuous use of chemicals for control of these diseases is not practical. Emphasis must be given to preventive measures and good management practices.

The sheep industry of the United States faces a crisis unlike any other food animal-producing industry on record. The present production of domestic lamb is barely sufficient to assure a viable sheep industry. Unless a supreme effort is made to help the industry, sheep production with the United States will be a thing of the past.

Sheep population in the United States reached its maximum numbers in 1942 when there were 56 million breeding ewes. Since then the numbers have declined to 18 million ewes in 1972. This represents a 63 percent decline in breeding stock.

Research on diseases of sheep and goats has made possible practical control measures for such problems as vibriosis, enterotoxemia, white muscle disease, and urinary calculosis. Still awaiting the development of adequate methods for prevention and treatment are caseous lymphadenitis, respiratory diseases, reproductive failure, foot rot, internal parasitism, salmonellosis, perinatal diseases of lambs, and other diseases that regularly cause severe losses in sheep. Until these problems are solved, the entire industry will suffer. The U.S. Department of Agriculture supports animal health research through the Agricultural Research Service and the Cooperative State Research Service. In 1975 about \$24 million was spent for such research. Of this only about \$1 million spent for research through the state agricultural experiment stations in colleges of veterinary medicine and departments of veterinary science of the colleges of agriculture. Over \$21 million was spent for support of research at Federal laboratories.

During the past 10 years increasing concern has been expressed by veterinarians and livestock industry groups over the need for more research emphasis and effort on animal health problems. During this period actual scientific effort in animal health research declined by 25 percent in the State agricultural experiment stations.

In 1966 the USDA provided funds to the veterinary medical colleges in an amount equivalent to only 2 full-time man years per college for 18 colleges, a total of 36 man years of effort. This level of support has declined to only 25 man years for 19 colleges.

While more effort is being expended in the federal laboratories, much of that work is directed to solving problems in current disease control programs of the USDA. It doesn't represent adequate effort directed to solving emerging problems and problems which may be regional in nature.

There are approximately 1,190 animal health scientists in colleges of veterinary medicine and another 330 in the State agricultural experiment station system. many of these people would prefer to do research on animal disease problems but they are working on human health related research because funding is available for that.

The level of research support for animal health problems is so low that there are too few opportunities for young scientists to obtain their graduate education with research problems in animal health. With this situation persisting, the ability to educate animal health research scientists is severely limited. This may represent one of the most serious problems for the future unless corrective measures are taken soon.

The American Veterinary Medical Association has encouraged the development of new authority for Federal financial support to encourage and assist the states in carrying out programs of animal health

research through grants for research and research facilities. Although such a proposal was passed with strong support by both houses of the Congress, the President vetoed the proposal. Similar proposals have been introduced in this session of the Congress and we continue to encourage action in the direction of a specific authority for funding animal disease research programs.

The proposal now being considered, H.R. 11743 and 11744, would provide renewed hope for appropriate financial support for animal health research and, in view of this, the American Veterinary Medical Association believes it to be an appropriate step in solving critical problems and encourages your favorable action on it.

Mr. Chairman and members of the committee, we appreciate this opportunity to present our views.

The CHAIRMAN. Thank you very much, Dr. Maurer. You have provided us with a very succinct and valuable statement. Your brief statement includes very relevant information which will be helpful to our committee as it considers this legislation.

We are very happy that you have taken the time to appear today so that we may all benefit from your recommendations.

Mr. Poage, do you have any questions?

Mr. POAGE. No questions.

The CHAIRMAN. Mr. de la Garza.

Mr. DE LA GARZA. I have no questions. Thank you.

The CHAIRMAN. Mr. Jones.

Mr. JONES. No questions.

The CHAIRMAN. Two years ago this committee reported a bill dealing specifically with animal health legislation and providing authority for increased grants to the veterinary colleges in the country.

Information gained through hearings at that time corroborates the facts provided in your testimony, Dr. Maurer. Every year both our livestock and poultry industries suffer substantial losses due to animal diseases. Further, these losses affect more than the agricultural sector alone. They are felt by the total community in terms of the food value and production. The Animal Health Research Act was introduced by Mr. Melcher of Montana. I am persuaded that the amounts requested in that legislation and in the bill that Mr. Wampler and others have introduced must be viewed in terms of their potential for offsetting costs and increasing the resources which exist and can be provided to the public.

I think you have correctly used the word "investment" to describe the kind of expenditure that would be involved and the potential benefits that could be received.

Dr. MAURER. I would like to say, sir, that we are very much in favor of the Animal Health Research Act as well as this legislation. We don't really care which one provides the funds as long as it becomes available to fill that very urgent need.

The CHAIRMAN. Again, we thank you for your testimony, which will become an important part of our record.

The next witness scheduled for this afternoon's hearings is Ms. Susan DeMarco, of the Agribusiness Accountability Project, Washington, D.C.

**STATEMENT OF SUSAN DE MARCO, AGRIBUSINESS
ACCOUNTABILITY PROJECT, WASHINGTON, D.C.**

Ms. DEMARCO. My name is Susan DeMarco. I am the codirector of the Agribusiness Accountability Project, which is a public-interest research and educational organization here in Washington.

I would like to thank the Committee for the opportunity to testify on this bill.

Obviously in these days of trying to balance the Federal budget, \$250 million is a lot of money. I would agree that agricultural research is important and needs to be adequately funded. I would, however, suggest that before Congress considers additional funding that it needs to take a look at how the current funds are being used. It may be that increases in funding are less important than the reduction with redirection of agricultural research presently being conducted.

In 1972, Agribusiness accountability project wrote a book "Hard Tomatoes, Hard Times," critical of land grant college institutions and their agricultural research.

The intervening years have only served to make us more critical. We are not alone in our disappointment. There have been other recent criticisms. The GAO reported to Congress in April of 1975 that small farmers had been neglected by USDA programs. Just this month, the National Academy of Sciences released a 3 year study warning of the ineffectiveness of pesticides and urged alternative control methods for the future.

The University of California, in June of 1975, released a study describing the impact of the tomato harvester. California had 4,000-tomato growers prior to the introduction of this technology. They now have 611. There are less jobs for farm laborers and less tasty tomatoes for consumers.

These studies, to name a few, confirmed that although there had been many accomplishments they have not been without cost. Questions about the future direction of agricultural research are being raised by a variety of people inside agricultural establishments as well as outside. These questions are being raised by people such as consumers and environmentalists.

Congress, if it intends to pump more tax money into agricultural research, has the responsibility to provide clear guidelines as to what that research should focus upon. It should not be just vague language about increasing agricultural production or lowering production costs for coordinating agricultural research.

We badly need clear direction and enthusiastic support for creative alternatives. Agricultural research is basically concerned with means. The public and their representatives have to be concerned with ends. And those goals must be spelled out even if they are only appropriate areas for exploration.

The establishment of a National Agricultural Research Policy Committee within USDA and so overwhelmingly composed of members of the agriculture establishment would seem to sanction a commitment for traditional research projects at a higher cost to the public.

Traditional projects have been primarily concerned with increasing agricultural yield while decreasing labor requirements. Sufficient domestic agricultural production in itself is not in jeopardy. Hundreds of researchers are equipped and inclined to do such research.

But there are many serious problems facing our food supply system and I am afraid that too little attention is being paid to those problems. For example, technological development since World War II have revolutionized our food system. But evaluations of the ramifications of the introduction of this type of technology are sadly lacking.

Energy, the commodity on which our highly industrialized agriculture is so dependent, has become more and more expensive. What are the implications of that change? Do we continue to develop technology that requires more and more fossil fuel? Or do we work on other alternatives such as solar energy? Should we abandon rail transportation of food if it is four times more energy efficient than trucks?

At this point, no one even knows how much energy is consumed within the food system. Eric Hearst of TVA did a number of studies. There are studies at Cornell University that estimate energy consumption in the food system is 14 to 15 percent. But admittedly, by the authors of those studies, this is a gross calculation.

USDA plans, I understand, to argue for a share of energy research funds on the basis that 25 percent is consumed in the food system. Who knows? Why don't we know?

We have not had to know in the past because fossil fuel has been relatively cheap and available. Today, we cannot afford not to know. The situation has changed drastically. The growing environmental awareness in this country has raised questions about the dangers of agricultural methodologies dependent on herbicides, pesticides, chemical fertilizer. Does that mean we should be increasing our efforts in the area of biological control of pests, of genetic development of disease resistant plants and the use of urban waste for fertilizer? What is the commercial feasibility of organic farming? No one in this country except Barry Commoner is even looking at this alternative seriously.

Mounting skepticism about the quality of our food has become more than a concern of health food advocates. Ross Hume Hall, a Canadian scientist, has estimated that the science of nutrition is 50 years behind the science food technology. We don't really know the long-range implications of the changes in our basic foods and our eating habits.

Mr. Clossey, of General Foods, at a Kansas City National Research Priority meeting last summer, stated that people who raised such doubts about food technology represented an antidevelopment force in this country.

Such an attitude only adds to the public's conviction that food corporations cannot be trusted to supply us with wholesome and nutritious foods.

We have lost 3 million farmers since World War II and we continue to lose them daily even though the rate has decreased. With unemployment looking like a constant 8 percent, we cannot afford to displace more people from farming. If we believe that the family farms are the backbone of an efficient, productive agricultural system, what kinds of policies can we adopt to assure their survival? Can family farmers remain in business if we continue to capitalize agriculture beyond the range of family-sized enterprises? If not, we should consider policies and technology that encourage the use of human labor instead of capital.

Are direct consumer farmer markets a feasible method of increasing farm income? Such an approach is currently being tried by a group of South Dakota livestock producers marketing beef to an inner-city co-op in Chicago. We need to know what institutional structures must exist to make this a viable economical alternative.

Preservation of agricultural lands means more than protecting it from the pressures of development. What are the effects of fence post to fence post planning? How do we provide for conservation practices? In fact, how do we define "conservation"? How do we keep land from becoming concentrated in the hands of landed elite, provide opportunities for new entrance into farming, and transfer land from one generation to another? Should land be viewed as a valuable natural resource as well as private property?

These questions are only a few of the serious issues the American public will have to face in the future. Congress has the responsibility to direct that vast, highly endowed with public funds, agricultural research complex; to put its unique skills to work addressing these concerns in evaluating the numerous alternatives we may have.

I disagree with Secretary Butz that the trends of past decades were inevitable and that we must continue along the same old paths. The only inevitability is that Government policies and programs have determined the kind of research that is being conducted and therefore the direction that we will inevitably go in.

This committee can encourage the system to be creative by clearly identifying areas of critical research needs so we can begin to accumulate the basic data we need to answer some of these questions and meet the future intelligently rather than as victims. Thank you.

The CHAIRMAN. Thank you, Ms. DeMarco.

Do members have any questions to ask of Ms. DeMarco?

If not, I should like to ask one. Is it your judgment that in considering legislation of this kind, the committee ought to set more specific guidelines for the type of research to be funded, than those called for in this particular bill and in other legislative acts?

Ms. DEMARCO. I think it is particularly important to set those priorities and directions when it is the kind of research that will probably not be conducted with State money because there is no particular reward to the agricultural industry in the State, and will not be conducted with private money that comes into land grant institutions because there is no particular profit motive involved. But there are larger questions that the society and the agricultural industry have to face inevitably.

The CHAIRMAN. There have been, for example, projects funded by the USDA, along with cooperative projects, to examine what biological control alternatives there are to pesticides.

Ms. DEMARCO. I would agree with that. There have been projects on solar energy; there have been projects on using waste from urban areas. I know the University of Arizona is doing some of that. But they are not really significant in the overall direction. And considering the overall staff and funds that that entire research complex has, their efforts are just too small. And we are facing these crises in the next two decades.

For example, the average age of the farmer is 55. This means that much of the land in the next few decades is going to transfer.

And we have a very serious problem of how that land is going to transfer—of whether or not it is going to be possible for people who either haven't inherited the land or have wealth outside of agriculture to farm.

I realize that some of those questions are more policy questions than technical questions. But technology determines what is economically feasible. So they are very tied together.

The CHAIRMAN. It seems that some of the suggestions contained in your statement might be dealt with better within another context such as in the social, legal, or tax policy areas. Granting that, these impact on the agricultural community as a whole, how it develops, and how it functions, is it your opinion that Congress should set some specific direction in agriculture, for conducting social policy research and examinations of that kind?

Ms. DEMARCO. Yes; I think we should do that. But I think you should also enthusiastically support the concept that we have to begin to look at alternatives to the present direction.

Agricultural production is not a problem. The only problem in this country, or at least for the farmers, has been that we have too much of it. We have to find ways to get rid of it and develop markets for it. Agricultural production is not a problem. But we have serious problems that are being overlooked. Our farm population is down to 4.5 percent of the general population. It seems to me that we don't have to deplete those numbers any further. But if they are to survive on the farm, we have to develop technology that is appropriate for the farmers that exist today. We just cannot let agricultural engineers, for example, because they have a new play toy, develop any kind of machinery that they want.

The CHAIRMAN. How would we stop the development of technologies? It is one thing to suggest that we encourage the development of technologies to suit the small farmer rather than the large operation. The development of a tomato picker, for example, or of any kind of machinery, however, will continue as long as there is a market. Are you suggesting, then, that we emphasize through government financed research the development of technology that will aid small family farms rather than the more mechanized ones?

Ms. DEMARCO. I am not talking about stopping technology, obviously. I am not interested in doing that nor hopeful that it could be done.

The CHAIRMAN. You gave the example of the tomato growers in California who numbered several thousand and who now, with the introduction of the automatic tomato picker, are down to 641 or so.

Ms. DEMARCO. They had over 4,000: they lost over 3,300 farmers.

The CHAIRMAN. Is there anything that could have occurred through agricultural research to prevent the introduction of that particular technology or its impact on the farmer?

Ms. DEMARCO. I don't think it is a question of preventing the introduction. I think that the technology has to have some goals. For example, North Carolina State has developed a tobacco harvesting machine. It is really a system because it involves curing barns also. But it operates at optimum efficiency, which is what you would have to do to afford it, on 20 acres. The average allotment is 3.1 acres.

One percent of the tobacco allotments is over 20 acres. So who is it designed for?

It is also technology that is used best on flat lands. This means there is going to be a geographical shift as to where tobacco is grown if that technology is adopted.

The machinery and the technology have been there for over 5 years. But one of the reasons it has been slow in being adopted is that the Labor Department of the State of North Carolina is very concerned about the 150,000 people who they say will migrate into urban areas as a result of being displaced.

Those kinds of considerations in designing your technology ought to be made when you are using tax money. They ought to consider the client. The client is the person who is already out there on the farm.

The CHAIRMAN. I don't want to seem argumentative, but it seems to me difficult to set very rigid guidelines as to the types and areas of research that would not become quickly outmoded. We found a few years ago that one of the main concerns, in the area of agricultural policy was the control of over-production. Within the Department of Agriculture, as I recall, there was some resistance to undertaking any sort of production-oriented research since the Department was struggling on the legislative side with doing something about very large crops for which there was no market.

In a matter of a few years, we are producing much more than before; and we are selling enormous amounts on the domestic and export markets. It takes the equivalent of 14 million acres of our land to produce for the import needs of Japan alone, that is more than the croplands of California, Idaho, Oregon and Washington put together.

It is conceivable, I would suppose, that with the expanding dependency upon our export market for cereal grains we might need some more production research in that area. What concerns me is that if, through legislative policy, we set research priorities based on assumption or conditions current in the year 1969 or whenever, there is every danger that, should these economic, political, or social conditions change suddenly, we would be unable to respond.

Ms. DEMARCO. I would argue that that kind of research will go on anyway. Production oriented, increasing-yield research will go on anyway. That is not your problem. Your problem is to get them off their butts and into doing something creative. That kind of research goes on all of the time. And there are very talented people in the land grant institutions who will continue to do it.

The CHAIRMAN. With this shortage of research funds, isn't it precisely that kind of research that is going to be given priority? Your assumption is, Ms. DeMarco, that there are powerful economic forces that generate and support production research at the local level and at the land grant colleges. And they help finance it to some extent, so I guess the argument they would therefore have some leverage. The rate of agricultural research funding is declining every year. Would you agree that it is precisely the innovative, creative kinds of research in marketing and other policy areas you support that is most likely to be eliminated or, at least not developed in a fund-starved research community?

Ms. DEMARCO. Yes. That is what I am saying. If there were some direction from Congress, that area would not be short shifted. But you have got to provide that kind of direction and that kind of enthusiasm.

When I talk to USDA people, they say, "Well, you know, this is a very dispersed system. We really don't control what goes on in the land grant colleges in terms of research projects."

When I go out and talk to people at the land grant colleges, they say, "Well, we get no encouragement and help or advice or direction from the Feds."

It is as if the responsibility has dropped into some great big vacuum. Nobody seems to be responsible.

And my argument would be that the Agriculture Committee of the House, as the people's representatives, has a right to state clearly the kinds of priorities we ought to have for the next decade or two. We should not just leave it to this National Agricultural Research Policy Committee because I don't think they are going to be very creative.

The CHAIRMAN. Again, I think your comments will certainly have to be carefully considered by this committee. My problem with your suggestion that Congress set guidelines is that in the real world, in the Congress, and even on this committee, there are many ideas and concerns competing for attention. I am afraid that there is also a danger that this committee might impose guidelines on research that would not be subject to review and analysis on a continuing basis. If this should prove to be the case, we might have a very disconnected research policy based on what are perhaps obsolete guidelines which do not afford groups such as yours or the research community generally an opportunity to modify them promptly to keep pace with shifting priorities.

Ms. DEMARCO. Maybe that is what your policy committee should be empowered to do. I think that the kinds of things that I have talked about are not going to go away. They are things that we are facing in the next two decades and with which we are going to have to come to terms. So I don't think there is any chance of that situation's drastically changing.

But should that situation change, this is what a policy committee could do. It could keep on top of those changes and come back to you as a committee and recommend changes in the legislation or additions to the legislation or additional funding or whatever is needed.

I think it is begging the question to say that because it is hard and because there are some risks involved that you should just not do it. That is rather what has happened over the past thirty years. You know, when Jamie Whitten wants fire ant control research, he gets it. And he doesn't seem to be worried about whether or not it is really needed every year.

The CHAIRMAN. I caution you that the two words—"fire ant"—create an enormous impact on this Committee, and more especially on certain members. There is one present now, I'm afraid.

Thank you very much, Ms. DeMarco. We appreciate your coming.
Mr. Harkin; then Mr. Moore; then Mr. Weaver.

Mr. HARKIN. I am sorry I wasn't here for all of your testimony, Ms. Demarco, but I was very intrigued by the exchange with the Chairman of the Committee regarding the thrust of research. I just wonder if what you are saying is that so much of our research not only in agriculture but in other areas as well, is really too technologically oriented.

Someone once made a remark to me that in this society if something is technologically feasible, we would do it without really taking into account its impact on the total social and economic sectors of our society.

Land grant colleges, of which there is one in the District I represent, have been very successful in the past few years in terms of their technology. They point with great pride to the fact that now only 4 percent of our population grows the food necessary for the other 96 percent. And only twenty years ago, it was something around 15 or 20 percent.

Now that is a great success story in one way. It is a great success story in terms of technological achievement. But I wonder if it is really a success story in terms of what it has done to our society.

I remember talking with a member of the Chinese delegation which was here in Washington about their agricultural program over there. They have developed methods in agriculture which are more oriented towards smaller farms. For example, they have developed tractors which are very small to farm very small plots of land. And I said to him, "Gee, wouldn't it be much better for you to develop larger tractors and farm more intensively on larger areas of land?"

He said, "Yes, but what would our people do? People should work."

I am just wondering if we are perhaps getting away from that work ethic and becoming so technologically oriented that we lose sight of the fact that pretty soon there won't be jobs for people. What will people do?

Is this the sort of thing you are talking about?

Ms. DEMARCO. Yes. I would clarify that some by saying that I am not opposed to technology. But technology does not exist in a vacuum. It has to be applied within a political, social, and economic framework.

Mr. HARKIN. In other words, if a proposal came up that would reduce the number of farmers down to 1 percent of the population, you do not necessarily think that is a good idea?

Ms. DEMARCO. The Northcentral Extension Study Committee said that we could probably produce 80 percent of the food needs of this country on 100,000 farms. I don't doubt that for a minute. The question is do we want to produce in on 100,000 farms. What is the advantage of that to society?

As far as I know, this Tomato Harvester study and the USDA study on the tobacco harvester were the first two serious studies of the impact of technology. These were not just on "social issues"—are there fewer migrant workers with jobs—but on the economics of the state in which that crop exists.

I think technology is important, but I think that technology serves people.

Mr. HARKIN. And you are saying that those decisions on whether or not to pursue a certain technological innovation have to be based

not upon the technocrats' decisions, but based upon decisions made by those with a wider viewpoint, i.e. those of us in Congress.

Ms. DEMARCO. Yes.

Mr. HARKIN. In other words, if we left the technological decisions up to the technocrats, they would have everything push button. But is that really what we as a society want to do? And that is perhaps what you are saying with regard to this whole committee.

Ms. DEMARCO. I think that society across the board faces this issue. It is not just an issue confined to agriculture. There is a major difference in that quality is of such importance in agriculture. There is no point in having a tomato that is picked by a machine if that tomato has no vitamin C in it. What is the point of my eating it if there is a loss of nutrition simply so that it can be picked by a machine? Now I am not saying that this is true. But in the area of food, it is even more important to determine the impacts of the technology that we are in the process of developing.

Mr. HARKIN. Thank you very much.

The CHAIRMAN. Mr. Weaver.

Mr. WEAVER. Ms. DeMarco, have you read the Barry Commoner articles in the last two issues of the "New Yorker" magazine?

Ms. DEMARCO. No; I have not.

Mr. WEAVER. I would like to point out, Mr. Chairman, that Dr. Barry Commoner has written a series of articles in the "New Yorker" magazine over the last 3 weeks having to do with the comments that Ms. DeMarco is making today. They had had a profound influence upon my thinking, I know, in that he is laying a scientific basis for the fact that our agriculture, among many other facets of our civilization and economy, may be based on the wrong premises. They are based entirely on terms of efficiency in production and the proper use of energy.

Certainly we need research in this direction and to explore new fields. I commend you, Ms. DeMarco, for bringing this point of view to the Committee. Thank you.

Ms. DEMARCO. Thank you.

The CHAIRMAN. Mr. Moore.

Mr. MOORE. Ms. DeMarco, I agree with much of your testimony, but I want to make the point that fire ants are a problem in Louisiana. We have lots of ants and nothing to kill them with.

The CHAIRMAN. Thank you very much, Ms. DeMarco. We appreciate your appearance and your testimony.

The Chair will recognize the gentleman from Texas. Mr. de la Garza, to introduce the next witness.

Mr. DE LA GARZA. Mr. Chairman, the next witnesses are from a very prominent institution in my District which has been in the forefront of every phase of agricultural research and development.

It is a happy privilege to present the committee with Manuel Salinas, who is vice chancellor of Texas A. & I. University. He will be accompanied by Dr. Robert Brown, assistant professor of the College of Agriculture and Mr. Terry McLendon, assistant professor of the College of Agriculture. Thank you, Mr. Chairman.

The CHAIRMAN. Thank you, Mr. de la Garza.

Gentlemen, we welcome you to the committee and will be very happy to hear your testimony at this time.

STATEMENT OF MANUEL SALINAS, VICE CHANCELLOR, TEXAS A. & I. UNIVERSITY SYSTEM; ACCCOMPANIED BY DR. ROBERT BROWN, ASSISTANT PROFESSOR OF ANIMAL SCIENCE, TERRY MCLENDON, ASSISTANT PROFESSOR OF RANGE SCIENCE, REPRESENTING THE COLLEGE OF AGRICULTURE, TEXAS A. & I. UNIVERSITY, KINGSVILLE, TEX.

Mr. SALINAS. I wish to thank the House Committee on Agriculture for this opportunity to appear as a witness and to express my strong support of H.R. 11743, the National Agricultural Research Policy Act of 1976. I feel that this Act will be of great benefit to the people of South Texas, the people of the entire Nation, and of the world.

National and International Agricultural Research Needs

Agriculture is of primary importance to every man, woman, and child in this world. We must eat to survive, and this is becoming an increasing problem to many of the people of the world. The problems connected with the increase in human population are familiar to each member of this Committee. From the time man first walked upon the earth until 1830, the world's population only increased to one billion. The second billion was added by 1930. 100 years later. The third billion required only an additional 30 years. The fourth, 15 years. By year 2000 various estimates place the world's population at between 6 and 7 billion people.

Yet, even if the population increase were stopped, there would remain much to be done. Even now 10,000 people starve to death each week. The United Nations estimates that currently 400 million people, one out of every ten, suffer from protein and energy deficiencies. Add to these the yet unborn and you can begin to grasp the magnitude of the problem facing world agriculture.

Although this Nation has been fortunate in having been spared the worst of these sufferings, we are deeply involved. These problems, wherever they occur, place an added stress on American agriculture. It is becoming obvious that this Nation cannot feed all of the world's hungry. Our resources have their limits. Our primary means of increasing production will be in more efficient utilization of the resources we have. This can be done only with increased funding of agricultural research. This will require a reversal of present trends. In 1940, 40 percent of the Federal research and development funds went for agricultural research. In 1970, less than 2 percent went for agricultural research. Without a reversal of such trends, we can not hope to keep pace with the demands we must face in the coming years.

Increased production from increased agricultural research would benefit the Nation in a number of ways. Increased food and fiber would be available to meet domestic and foreign needs arising from an increased population and would allow for raising the nutrition of millions to acceptable levels. This increased production should be of economic benefit to the producers by providing increased incomes, to the consumers by lowering costs, and to the Nation by strengthening the domestic economy and by improving the foreign balance of payments.

Such research would also function in allowing more families to remain on the farm or ranch, would be of benefit in conserving

our natural resources, and would contribute to protection of our environment.

Agricultural Importance of South Texas

In addition to national and international needs, there are regional considerations involved in the outcome of this Act. And in no region are these considerations more critical than in South Texas.

The region of Texas south of the Balcones Escarpment and west of the San Antonio River covers an area of approximately 36,000 square miles, as area greater than the individual areas of 12 of our 50 States. The population of South Texas is 1.9 million, more than the populations of 17 of our States. Eighty percent of these people are urban and 20 percent are rural.

The economy of South Texas is primarily agricultural or agriculturally based. In 1969, the combined agricultural output of this region was \$394 million. The two major products of the agricultural industry in South Texas are cattle and grain. In 1969, the region supported 1.6 million head of cattle and produced over 67 million bushels of corn, grain sorghum, and wheat. The area also is a major national center for production of citrus, cotton, sugarcane and vegetables.

In addition to the agricultural production of South Texas, the region is similar in climate, soils, and vegetation to vast areas of the underdeveloped nations of the world. Forty-three percent of the world's land surface lies between 30° N and 30° S. Eighty-two percent of the areas of developing nations lies between these latitudes. Of the entire area of the United States below 30° N, over one-fourth is in South Texas, making the region important as an agricultural research area supplying information for use in those areas of the world most in need.

Unique and Specific Agricultural Research Needs in South Texas

Some of the agricultural research needs in South Texas can be met by applying findings from other areas. Many of the needs, however, can be met only by research within the area because of its unique climatic, edaphic, sociological and vegetative characteristics. For instance, grain production in South Texas increased by 138 percent between 1940 and 1969 as compared to 124 percent for Texas as a whole. This increase was the result of improved farming methods and crop varieties resulting from agricultural research throughout the Nation. On the other hand, cattle production in South Texas increased by only 56 percent during the same period as opposed to 99 percent for Texas as a whole. The problems of climate, disease, economics, parasites and vegetation manipulation unique to the area hold back advances in beef production in one of the nation's major cattle producing regions. If we are to overcome these problems, we must have increased funding, within South Texas, for agricultural research.

Specific needs in the various disciplines within the South Texas are as follows:

Agricultural Economics

1. Economic integration of the cattle, wildlife, range, and improved pasture systems,
2. Marketing and transportation problems on the state, national, and international levels,

3. Enterprise optimization.

Agricultural Mechanization

1. Minimum tillage technology to reduce consumption of fuel resources,
2. Brush control equipment design to maximize efficiency of brush control operations,
3. Irrigation technology to increase effectiveness of irrigation equipment and techniques.

Animal Science

1. Climatological studies of the effects of a sub-tropical environment on feed intake and efficiency, animal reproduction, and carcass quality,
2. Development of drought resistant feeds and emergency feeding systems to be employed during recurrent droughts,
3. Development of new protein and non-protein nitrogen sources, including the recycling of animal wastes and industrial by-products,
4. Inventories of localized mineral deficiency and toxicity problems combined with management systems to deal with them,
5. Studies of the management and treatment of animal parasites and diseases,
6. Examination of the efficacy of safe antibiotics and growth promoting substances to increase the economic feasibility of regional cattle-finishing operations,
7. Identification of the genetic influences that affect animal growth and production in a sub-tropical climate, and the development of new and hardier breeds,
8. Integration of climatic, genetic, nutritive and disease factors to maximize the amount of high quality animal protein per unit of cost.

Plant Science

1. Crop breeding and variety testing to improve current crop varieties and develop better adapted varieties,
2. Adapting fertilization and irrigation practices to maximize regional crop yields,
3. Forage analysis and quality control to maximize forage quality and livestock performance.

Range Science

1. Grazing system development to maximize the utilization of low-palatability species and to minimize the effect of periodic droughts,
2. Brush control to increase forage production within mixed-brush communities,
3. Range nutrition research to determine seasonal nutrition requirements for livestock and to determine the ability of various rangeland to provide the required levels,
4. Investigations of primary productivity and successional dynamics to determine the productivity and stability of rangelands,
5. Range resource inventories to determine proper production levels and limitations,
6. Investigations to maximize multiple use of watershed, mineral, and recreational potentials on South Texas rangelands.

Soil Science

1. Soil mapping to determine productivity limitations,
2. Soil salinity research to increase productivity of saline soils,
3. Soil physics research to minimize detrimental physical effects of sands and clays.

Wildlife Science

1. Habitat studies to determine basic habitat requirements of wildlife species of the region,
2. Wildlife productivity studies to investigate the potential contribution of wildlife to human food production,
3. Wildlife-livestock interactions to study the compatibility of wildlife and livestock production,
4. Wildlife nutrition studies to determine the requirements of the wildlife species and the ability of the regional vegetation to meet these needs,
5. Economic studies to investigate methods of production, improvement, and harvesting of wildlife.

Proposals to Better Meet the Agricultural Research Needs of South Texas

Agricultural research in South Texas has come from four institutional sources. Texas Tech University and Texas A&M University Experiment Stations have conducted agricultural research, all of which has been of limited extent along the edge of the South Texas region. The problems investigated have been most applicable to regions of the State other than South Texas. Both Texas A&M University and Texas A&I University have conducted research well within South Texas proper, but Texas A&M University is about 250 miles from the center of the region. Texas A&M University is also committed to research programs in the remainder of the State, an area larger than six times the size of the State of Pennsylvania or Virginia.

Texas A&I University is the only university located in South Texas which has an agricultural program, but we have been limited in research because of lack of federal funds resulting from our non-land grant status. Our agricultural research program to date has been almost entirely dependent on limited state funds and grants from foundations, corporations, and ranchers. Despite this handicap, we have research underway in economic aspects of production enterprises, beef cattle production, cattle intake—forage quality relationships, forage quality analysis, physiology of forage species, native plant indicators of power plant pollution, Whitetail deer and Whitemwing dove habitat studies, and Whitetail deer nutritional relationships. Texas A&I University Citrus Research center at Weslaco has had an economic impact valued at more than a billion dollars.

In order to meet the needs of the producers and consumers in South Texas, new ideas for practical solutions to the immediate problems facing the agricultural industry in South Texas are needed. We must find methods to make better use of our existing resources if we are to overcome the difficulties the industry is facing. I feel that the emphasis on the problems of South Texas by universities outside the region is currently not great enough, nor will it be in

the foreseeable future. Regional problems most often require regional solutions.

How Federal Funding at Texas A&I Would Help Meet the Agricultural Research Needs of South Texas

Land-grant universities, especially in the larger states, tend to concentrate their research efforts on broad-based problems that usually require very large expenditures of money. This policy often deemphasizes the uniquely regional problems of limited scope. It is in these latter areas of agricultural research that the smaller universities can make their best contributions to the nation's agricultural program. But in order to do so, these universities need access to federal funding—not on a handout basis, but on the basis of the merits of the proposed research. It is my feeling that this would be a positive result from the passage of the Act under consideration.

Secondly, smaller universities often have less overhead costs attached to their research programs. The standard overhead cost at Texas A&I, for instance, is approximately half that charged by some land-grant universities. In addition, the proximity of the University to the research area reduces transportation costs and lost time in transit. This proximity also aids in recognizing problems and in communicating with area producers.

Finally, there is a greater ability to develop multidiscipline research programs in those universities where the smaller size brings the professionals from all agricultural disciplines into daily contact. This in turn allows for more efficient use of research dollars by maximizing input into problem solving.

For the reasons presented in this statement, I, as a representative of the College of Agriculture of Texas A&I University, Kingsville, strongly support the passage of this Act. There is a desperate need for increased federal funding of agricultural research, on all levels, and a very real need for increased availability of these funds for qualified, non-land grant universities.

I again thank this Committee for the opportunity to appear in support of the National Agricultural Research Policy Act of 1976, and I hope that the Committee, and the Congress, will act in the best interest of the Nation in their decisions concerning this Bill.

The CHAIRMAN. Thank you very much, Mr. McLendon. We appreciate your testimony and are very happy that you, Vice Chancellor Salinas, and Dr. Brown, were able to appear today.

Are there any questions of the witness?

Mr. Poage.

Mr. POAGE. Mr. Chairman, I would like to make a comment on the situation existing in Texas. Of course it exists in other States, but we are familiar with our own programs.

I am much concerned in connection with this bill about what will be the future of the Federal research centers. You know that I look upon the Forage and Grassland Center at Temple as one of the most important factors in developing a livestock industry throughout the whole of the West. I want to be sure that we are not taking action that is going to try to transfer the activities of those centers to Texas A&I or Texas A&M or Texas Tech University or Iowa State or Cornell or anybody else. I think those centers can do, are doing, and will do a tremendous job in research.

I recognize that the research cannot all be conducted in Temple, Tex. Certainly some of it needs to be done in South Texas and some of it done in Arizona and some of it done in Montana. But there has got to be some place where that is coordinated. There has got to be some center that handles that. We have those centers in various activities now. And I am very anxious that we maintain those centers.

How do you feel about that?

Mr. McLENDON. I agree very much. I think these centers have contributed greatly to agriculture for the Nation. I think they have a tremendous potential in the years to come. I think as Federal centers, they should have a significant place in both research and coordination.

Mr. POAGE. I have been afraid that this bill did not recognize this. Now Mr. Wampler, I am sure, has to recognize it, but personally I don't think much of these sets of congressional resolutions. We have passed a hundred of them since I have been here and I have never seen one that had any particular effect except that it got into the newspaper.

I want to see something positive there. We have at Brownwood the only Pecan Research Center in the United States. I recognize that you are a little too far south to say pecans are as important as they are in North Texas and southern Oklahoma. But this is a problem of real importance in an area running all of the way from the Atlantic Coast out into Arizona. And we have one center in Brownwood, Tex. To my mind, that ought to be developed. Sure, I want to know how pecans will do down in the Rio Grande Valley; I want to know how they are going to do up in Oklahoma or maybe up to Arkansas. And I think you have got to do some research locally. You've got to plant some in those areas. But you cannot turn over to A&I or to Oklahoma A&M or to West Texas State or any of those institutions the research on pecans. There has got to be some coordination of that or it isn't worth very much.

I think we have got to maintain these present research centers to coordinate those works.

Am I wrong about the pecan work? Does it have to be centered somewhere?

Mr. McLENDON. I think there should always be certain centers at certain institutions that carry the brunt of certain research. This is especially true of larger schools because of their facilities. They pretty much have to take on the responsibility for some of the most expensive research. For grasslands, we have Temple; we have the IBP program out of Colorado State University. And yet, these centers have done and will continue to do, I hope, great work in perhaps the most broadly applied work. And yet we still need local work if for no other reason than to quantify or equate these results. We are limited. We cannot get this.

Mr. POAGE. I agree with you entirely as to the need of scattering out your actual tests and those sorts of things. I think that is essential. That is one of the reasons I think you make a good case for doing work outside of the land grant colleges. Certainly A&M has done a magnificent job for 100 years—100 years ago this year. They have been doing fine work. I tell A&M stories just as everyone else does,

but I know that they are a great school. Certainly they are. But they are not the only great school in Texas.

Oklahoma A&M is a great school. Colorado State is a great agricultural school—even if I did go to the University of Colorado. They have a great school up there. But they are not the only places for carrying on this kind of work. There is no branch of A&M in that South Texas area that you describe, which was bigger than Pennsylvania and had more people than Nebraska. There is no branch of Texas A&M University there. But you have an institution there that can do that kind of work and I am for your doing it. I want you to do it. All I am saying is let's make sure that we have proper coordination of these programs through our federally operated research centers. That is all I want to make sure of.

Dr. BROWN. It seems to me, sir, that this is the whole idea of a research policy committee—to direct this sort of thing, to direct what type of research the Federal centers will do, what type the land grant schools will do, and what type should be done outside land grant schools.

The CHAIRMAN. Unfortunately, the committee, in response to the signalling of these bells, will be required to adjourn very shortly. The bells signal that there will be a vote shortly. Following that, there will be a vote every 5 minutes on bills that are being considered.

Are there any more questions?

Mr. SALINAS. Mr. Chairman, may I speak to the question Mr. Poage brought up?

The CHAIRMAN. Yes.

Mr. SALINAS. I simply want to emphasize as my colleague has mentioned, that we feel that if this bill were to go through as it is proposed that it would strengthen these centers to which Mr. Poage refers. It would simply give us the opportunity to work with problems or plants or what have you that are indigenous to our area. For example, you mentioned the pecan situation. Perhaps in our area we could work with the better use of cactus in feeding cattle or something of that nature.

But in response to the question, I think it would strengthen these centers and give a center for us to work from, but give us an opportunity to work in these individual areas that are indigenous to our population and our needs in the South Texas area.

The CHAIRMAN. Gentlemen, again we thank you.

Mr. WAMPLER. I simply want to commend Mr. McLendon who presented the principal testimony. We appreciate his presence and the presence of his two colleagues here. I think you made a very excellent statement. I hope you have made a contribution in convincing Mr. Poage that this legislation is designed to complement and not to replace our traditional Federal research centers.

I think it can do that. And as one who worked a great deal on this bill, let me assure you that my purpose is that it will complement rather than replace.

The CHAIRMAN. Thank you again, gentlemen. We appreciate your appearance.

Mr. Hall, you are scheduled to be the next witness. I am afraid that the committee now has only about 3 minutes before it will have to adjourn. Would you prefer being rescheduled for tomorrow?

MR. HALL. With your permission, Mr. Chairman, I would like to file the statement we have prepared in support of the bill, recommending certain amendments to emphasize the importance of forestry and utilization research. And with those suggested amendments to emphasize that, we do support the enactment of this legislation.

The CHAIRMAN. Thank you very much, sir. Our time has expired. Your statement, however, will be included entirely in the record.

Because of your regrettable lack of opportunity to present your statement formally, Mr. Hall, I will promise to pay particular attention to what your recommended amendments are.

MR. HALL. Thank you.

[The prepared statement of John F. Hall, vice president for Forestry and Environmental Affairs, National Forest Products Association follows:]

STATEMENT OF THE NATIONAL FOREST PRODUCTS ASSOCIATION

Mr. Chairman and members of the committee, I am John F. Hall, Vice President for Forestry and Environmental Affairs of the National Forest Products Association. Accompanying me is John A. Couture, Legislative Counsel to NFPA.

Headquartered in Washington, D.C., NFPA is a trade association having a membership of twenty-six federated associations. As a result of a recent membership restructuring, we also have a number of direct company members. We represent timber growers, manufacturing and wholesalers throughout the nation.

We are pleased to have this opportunity to speak in general support of H.R. 11743, the "National Agricultural Research Policy Act of 1976." We do so because we believe that research devoted to the things that are grown for man's use and consumption—which include timber and other wood fibers as well as food and livestock—can alleviate the worldwide supply problems for all these commodities anticipate for the future.

Our association has a limited budget, but we annually allocate to direct research activities approximately \$110,000 of our Technical Services budget to various research activities and approximately \$33,000 of our Forestry Affairs budget. We also supply about \$40,000 to a special project fire research fund.

In addition to funds spent on direct research, we expend substantial budget amounts on staff and their projects to seek wider implementation of research findings and new technology in wood uses. Industry as a whole, of course, including other trade associations, spend many times these amounts on basic research and implementation.

We support this bill on the understanding that it is the intention of its sponsors to include research relating to forestry, timber harvesting, conversion and utilization. Additionally, the policies associated with the research and the plans and programs that are ultimately developed should include wood fibers.

We believe that a focus of agricultural research on timber growth and utilization is vital if housing and other wood products and wood fiber needs in the next decade and beyond are to be met. Numerous Congressional committees and executive branch task groups and advisory panels have concluded that timber growth and harvesting on public and private lands must be increased and the total available timber supply must be expanded through more efficient usage if these needs for wood are to be met. This explains why I have included with my statement as Exhibit A our suggested amendments and additions to H.R. 11743.

Beyond the importance of including specific mention of forest research in the bill is the necessity of transferring and translating the new technology developed from forest and forest products research into commercial usage. Because this key element in achieving a reasonable balance between future public demands for wood and available timber resources has often been missing in past forestry research projects, we have tried to provide in our amendments the mechanism for such a transfer. Hopefully, the Agricultural Research Policy Committee established in this bill, and a special Office of Timber Growth and Utilization Research, will see to it that the millions of dollars being invested annually by federal agencies and academic organizations in forestry, timber harvesting, conversion and utilization research will produce greater benefits to the nation.

There are several impediments to technology transfer. One is the fragmented ownership of the commercial forest lands in the U.S. and the large number of small and

medium size companies that account for a major portion of total production in many product lines. Another problem is that the research objectives of federal and state agencies are often uncoordinated. A third problem is that government and industry motives are often questioned and there are conflicting opinions over their appropriate roles. Finally, there is the particularly acute problem of the absence of factual and credible economic data.

We should like to congratulate all of those who cosponsored this legislation and their sensitivity to improving agricultural research. I hope that you will agree to including timber growth and utilization research within the ambit of this legislation and further that you will create the necessary office and authority to assure that the products of this research are put to commercial use.

Thank you for this opportunity to appear here today.

EXHIBIT A

FROM THE NATIONAL FOREST PRODUCTS ASSOCIATION, FEBRUARY 17, 1976

RECOMMENDED AMENDMENTS AND ADDITIONS TO H.R. 11743, THE "NATIONAL AGRICULTURE RESEARCH POLICY ACT OF 1976"

I. Suggested Amendments to the Bill

1. On page 1, line 8 after "research" insert a comma and add: "which includes research on timber growth and utilization as well as food and other agricultural commodities".
2. On page 2, after line 10 insert the following as paragraph (5) and renumber the succeeding paragraphs accordingly:

"(5) meeting the nation's housing and other wood products needs depends on increased timber growth and harvest on public and private nonindustrial forest lands, consistent with environmentally sound principles and on expansion of the total available timber supply through more efficient usage".
3. On page 3, line 8 insert the following before the period:

"(and to assure the transfer of new technology from forest products research into commercial usage".
4. On page 3, line 13 strike "and", add the following as paragraph (3) and renumber the succeeding paragraph accordingly.

"(3) to encourage and facilitate the development and implementation of more efficient and environmentally sound methods of growing, harvesting, converting and utilizing wood products; and".
5. On page 4, line 6 strike "and" and between "nutrition" and "conducted" insert the following: "and timber growth and utilization.".
6. On page 6, line 1 strike "fifteen" and insert in lieu thereof: "seventeen".
7. On page 6, line 5 strike "and" and insert in lieu thereof a comma.
8. On page 6, line 6 insert the following before the semicolon: "and one from the United States Forest Service".
9. On page 7, line 4 between "agriculture" and "trade" insert: "and forest products".
10. On page 7, line 8 strike "and".
11. On page 7, line 9 strike the period and insert in lieu thereof a semicolon and "and".
12. On page 7, after line 9 insert the following: "(f) one from professional forestry associations".
13. On page 8, after line 4 insert the following: "(5) Assure the transfer of agriculture and forestry research into widespread commercial usage".
14. On page 8, at line 8, strike the period and insert a comma and the following: "and shall include research on timber growth and utilization".
15. On page 10, line 10 between "agricultural" and "and" insert a comma and "forestry".

II. Recommended Addition to the Bill

On page 5, after line 19, insert the following new section and renumber the remaining sections:

"OFFICE OF TIMBER GROWTH AND UTILIZATION RESEARCH"

Section 5(a). The Secretary shall establish within the United States Department of Agriculture an Office of Timber Growth and Utilization Research (hereinafter referred to as the "Office") and through such Office shall,

(1) Contract for, sponsor, co-sponsor and promote the coordination of application and development programs, including design, construction and operation of pilot process projects and economic feasibility demonstrations concerned with the following—
(a) planting, protection, and nourishment of forests;
(b) tree harvesting, including thinning, felling, ecological impacts and forest residues;
(c) conversion of trees into useful products, including sawmilling, peeling, drying, gluing, and pressing and mechanical and chemical fiber making, and
(d) improved efficiency of wood use including protection, systems design and innovation, recycling, and waste conversion;

(2) Encourage and, when necessary and appropriate, contract for or otherwise sponsor and co-sponsor research to fill gaps in supporting technologies which impede commercial development or implementation of forestry and wood research;

(3) Promote the coordination of federal, state private forestry and wood research; and

(4) Establish a technical advisory committee composed of recognized leaders in the forest products industry, in the forestry profession and in federal and state government and educational institutions (a) to assist in the identification of problem areas, establishment of priorities and evaluation of research progress and of all research proposals and contracts, and (b) to assure avoidance of duplication in research.

(b) The Office shall encourage and support forestry and wood research conducted or funded by the Forest Service, by the Cooperative State Research Service, by the National Science Foundation, and by the state governments, educational institutions and other organizations, including other agencies and departments of the United States. In accomplishing this objective, the Office shall be concerned primarily with the transference of such forestry and wood research into widespread commercial usage.

(c) The Office shall give special attention and emphasis to those practices, processes and product development projects which promise benefits of a general nature but as to which implementation is otherwise inhibited or unlikely because of the high risks and costs in terms of the resources and capabilities of potential users. The design, construction and operation of pilot demonstrations, pilot process projects, pilot plants, economic feasibility demonstrations, test marketing and projects of a similar nature shall be done only by private sector, non-governmental contractors.

(d) The Secretary may appoint a Director of the Office of Timber Growth and Utilization Research without regard to the provisions of Title 5, United States Code, governing appointments in the competitive service and without regard to the provisions of Chapter 51 and Subchapter III of Chapter 53 of such title relating to classification and General Schedule pay rates.

The CHAIRMAN. The committee will stand adjourned to meet at 10 a.m. tomorrow.

[Whereupon the committee adjourned at 3:20 p.m.]

NATIONAL AGRICULTURAL RESEARCH POLICY ACT OF 1976

WEDNESDAY, FEBRUARY 18, 1976

**HOUSE OF REPRESENTATIVES,
COMMITTEE ON AGRICULTURE,
*Washington, D.C.***

The committee met at 10 a.m., pursuant to call, in room 1301, Longworth House Office Building, Hon. Thomas S. Foley (chairman) presiding.

Present: Representatives Foley, Poage, Vigorito, Jones of North Carolina, Jones of Tennessee, Melcher, Bowen, Weaver, Baldus, Krebs, Hightower, Bedell, McHugh, English, Fithian, Jenrette, Wampler, Sebelius, Johnson, Madigan, Jeffords, Kelly, Grassley, Hagedorn, and Moore.

Also present: Fowler West, staff director; Steve Pringle, staff assistant; Glenda Temple, staff assistant; Leighton Lang, staff consultant, Subcommittee on Oilseeds and Rice.

Mr. POAGE. The Committee on Agriculture will come to order.

We are continuing the hearings on the Agricultural Research Policy Act of 1976.

Our witnesses this morning are representatives from National Association of State Universities and Land-Grant colleges.

Our first witness is Mr. Daniel G. Aldrich, Jr., chancellor, University of California at Irvine, and president of NASULGC.

Mr. ALDRICH. I wonder if I might be joined by my colleagues who will follow me?

Mr. POAGE. Certainly.

Mr. ALDRICH. I will introduce them as they come forward to join me.

They will come forward in the order in which they will subsequently be making their presentations.

The first is Dr. Harry O. Kunkle, dean of the College of Agriculture, Texas A&M University. Then we have Dr. James H. Anderson, director of Agriculture and Forestry Experiment Station, Mississippi State University, Mississippi State, Miss.; Dr. Roland H. Abraham, director, Agriculture Extension Service, University of Minnesota, St. Paul, Minn.; Dr. Charles B. Browning, dean of Resident Instruction, College of Agriculture, University of Florida, Gainesville, Fla.; and Dr. Coyt T. Wilson, director, Agriculture Experiment Station and Executive Associate Dean of Research Division, Virginia Polytechnic Institute and State University, Blacksburg, Va.

I also would like to indicate that there will be supporting witnesses who will deal with some of the details that you may wish to question

us about. There is Dr. George M. Browning, who is regional director of the North Central Agricultural Experiment Station, Ames, Iowa; Dr. Patricia J. Sailor, director, School of Home Economics at Louisiana State University; and Dr. McKinley Mayes, research coordinator of Southern University, Baton Rouge, La.

As each of these individuals makes his presentation; I would hope that his testimony would be entered into the record.

In the presentation given by Dr. James Anderson, we would ask that that be entered into the record, and the testimony of Dr. John Gray, School of Forestry and Resources of the University of Florida. Dr. Gray is not here. He is president of the Association of State Colleges and University Forest Experiment Organizations, and he is also director of the School of Forest Resources at the University of Florida.

Mr. POAGE. Without objection, we would be glad to have each of these people make such statements as they desire, and we will be glad to include their full statements in the record.

Mr. MOORE. Mr. Chairman, before we begin, I would like to welcome Dr. Sailor and Dr. Mayes, who are from two fine institutions in my district. I would like to comment that any information that they have would be of an expert order.

Mr. POAGE. If they are from Louisiana, then they must be fine representatives.

**STATEMENT OF DANIEL G. ALDRICH, JR., CHANCELLOR,
UNIVERSITY OF CALIFORNIA AT IRVINE, AND PRESIDENT
OF NASULGC**

Mr. ALDRICH. I appreciate the committee's invitation to speak on the proposed Agricultural Research Policy Act of 1976, introduced by Mr. Wampler of Virginia.

My colleagues and I in the National Association of State Universities and Land-Grant Colleges enthusiastically support this bill in principle. This act, if made law and realistically funded, will provide the kind of support that we see vital if we are to continue conducting the scope and quality of agricultural research that is appropriately expected of us.

My colleagues will comment in particular about the proposed legislation. I, however, will make general remarks about the pivotal role which agricultural research plays in securing adequate food supplies.

I begin with the premise that the search for new knowledge is absolutely essential to progress, regardless of the area of endeavor. If I may accentuate this already encompassing statement; in few fields is this as clearly true as it is with agriculture.

The early developers of our land-grant universities recognized this to be so 100 years ago. Dreams of substantially increasing our agricultural productivity were correctly seen to be dependent on the large-scale adoption of scientific farming methods.

Before this could be accomplished, the cart had to be put in its proper juxtaposition to the horse. The science of agriculture had to be developed first. Modern agriculture is wholly the result of research undertaken—both publicly and privately financed and conducted—to develop that science.

It is not overstatement to claim that a century of American agricultural exploration and discovery has wrought more progress than that achieved in the countless millennia preceding it.

There are certain problems inherent in advocating increased funding for scientific research. A tight economy always poses such a problem. So does a mysterious popular skepticism regarding the way in which scientific inquiry is conducted. This skepticism seems to ebb and flow by the degree to which commentators poke fun at research activities that they know little about.

It seems to me that in acknowledging the economic problems facing us, we must look at money spent on agricultural research as an enormously wise investment rather than simply expenditures.

Our ample harvests and prolific livestock give full testimony to the correctness of this view.

As for the wonder and incredulity expressed at times over what scientists and scholars do, it is interesting to note that rarely is this consternation directed at men and women working on agricultural problems. It is as if the connection between what takes place in the experiment station and the quality and quantity of our food supplies is seen to be a clear and direct tie by even the most casual observers. These observers are, of course, right on target.

As a matter of public policy, our Nation has given continuous support to agricultural research. Federal dollars have not fluctuated wildly to the detriment of sound research. Few things are more frustrating, or a bigger waste of money, than to bring scientists together, purchase expensive equipment, and take numerous other steps to methodically deal with a serious problem, and to have funding turned on and off like an overworked faucet.

But, while Federal support for agricultural research has steadily grown in current dollars, inflation has diminished what these dollars permit us to do. The number of agricultural scientists on the faculties of NASULGC member institutions which I represent has actually decreased in recent years—essentially because of the erosion of our purchasing power.

It is in large part due to what inflation has done, as well as the overwhelming fact that at no time have advances in agricultural research been more critically needed, that a substantial additional investment in research is now required. My colleagues and I believe that the proposed bill, in principle, meets that need.

There are three points that I would like to make at this juncture.

First, history shows us that agricultural progress is as much the friend of the consumer as it is the farmer.

Second, our economy—especially in its international context—is intimately tied to the vitality of our agriculture. That vitality, in turn, is tightly linked to agriculture's scientific undergirding. To note the obvious: the economic fallout of a scientific advance is often every bit as dramatic and important as the scientific breakthrough itself.

And, third, agricultural research, does not occur in a vacuum. Not only is there an economic fallout to which I have just referred, but also scientific fallout. Major advances in genetics, bio-chemistry, nutrition, and pathology owe much to studies in agriculture. Agriculture is the meeting ground of the sciences.

In much the same way, agricultural research can be expected to continue contributing to other fields of knowledge—to the direct benefit of our citizens—if afforded appropriate support.

I wonder how many people know that it was agricultural scientists, and not just those working in academic settings, who developed techniques for the mass production of penicillin and, subsequently, other drugs; or that it was agriculturalists who discovered that vitamin D could be supplied by the direct radiation of ultraviolet light, resulting in the elimination of rickets not only in farm animals but also in humans.

Or that it was agricultural scientists who discovered streptomycin, the first of the wonder drugs to show hopeful results in the treatment of tuberculosis.

Let me conclude by again noting the obvious: the production and equitable distribution of food has only begun to be recognized as the world's most serious problem. Regardless of how limited or expansive a role one wishes to see the United States play in dealing with this problem there seems to unanimity that we are destined to play a major role, nonetheless.

I, for one, hope that our country does, indeed, do everything it reasonably can to help people feed themselves, but if we are to follow this route it will be self-delusion of the worst order if we try to do so without making the requisite commitment to scientific research.

Here I am speaking about scientific inquiry not only into the strictly agricultural sciences but in other areas that impinge on the food dilemma.

I am talking about disciplines such as public health, economics, political science, engineering, and others.

Our colleges and universities have the human resources to play an increasingly key role in helping provide adequate food supplies.

The Congress and the President, through the recent passage of the new title XII of the Foreign Assistance Act of 1961, have recognized these talents and sought to use them to help contend with the prospect of widespread famine.

In principle, the National Agricultural Research and Policy Act of 1976, will likewise, help better utilize the agricultural talents of our universities.

I hope that these comments are helpful to you and set the stage for the comments to follow.

May I introduce now Dr. Kunkle?

Mr. POAGE. Thank you, Dr. Aldrich. We appreciate your statement.

I might explain that our practice is to have our witnesses respond to questions and answers after all the witnesses have presented their statements.

I would like to say a word about Dean Kunkle. I consider him the head of one of the finest agricultural institutions in the United States. There are others who might slightly differ with that.

But, in spite of the stories that might have been told about the college down there, we still recognize that it has done a great work for about 100 years. We trust that in the next 100, it will do 100 times greater work than it has done in the past.

Anyhow, Dean Kunkle has contributed a great deal to agriculture, not only in Texas but across the country.

We would now be delighted to hear from Dean Kunkle.

**STATEMENT OF H. O. KUNKLE, DEAN, COLLEGE OF
AGRICULTURE, TEXAS A&M UNIVERSITY, COLLEGE STATION, TEX.**

Dean KUNKLE. Thank you for that introduction.

I would like to start out with an important report. We left yesterday with the first significant rain of the winter.

Mr. POAGE. I got a report on that rain. We got eighteen-one-hundredths of an inch out there.

Dean KUNKLE. But that is still the first significant rain that we have had in a long time.

As the Chairman has indicated, I am H. O. Kunkle, Dean of Agriculture, Texas A&M University, and administrative head of agriculture for the Texas A&M University System, with purview over the College of Agriculture, the Texas Agricultural Experiment Station, the Texas Agricultural Extension Service, the Texas Water Resources Institute, and the Texas Real Estate Research Center.

The dual Federal in-house and Land-Grant University-State Agricultural Experiment Station system of agricultural research has served well these United States. In fact, most of the successes of agricultural research have actually stemmed out of that system, and it is by and large a very viable system even today.

It consists of a large number of people who are dedicated, who have devotion to their mission. It is a system, however, whose resources are being stretched beyond prudent limits by the complex demands being placed upon it.

You will hear evidence concerning the sufficiency of agricultural research in the United States. I will not take the time to go into that vein, but I would like to take, perhaps as an example, a local situation. One could pick any number of local situations throughout the United States. Let me just take one in Texas.

The research situation in the Lower Rio Grande Valley of Texas is a microcosm of what has been accomplished in research and what has been happening to agricultural research.

The Lower Rio Grande Valley has been served fairly well by the agricultural research system, both State and Federal. It is here, as well as anywhere, that one can see the value of scientific effort. It is a highly productive agriculture. We know that the onions, the tomatoes, the cantaloupes and other vegetables, the grain sorghum and cotton, a new cane sorghum production system, viable citrus production, effective pest control strategies, and other elements of profitable agriculture are there because of the application of technology that has come from science.

But it is an area that continues to have high peril for its agricultural endeavors. Agriculture along the Lower Rio Grande River is subject to hazards of erratic freezes, of hurricanes, of drought or too much rain sometimes in successive weeks, of marketing problems, meeting regulatory requirements of insect pests and diseases moving across the Rio Grande River which in moving have wasted a significant amount of Mexican agriculture.

Then there are such things as a reach for environmental quality evolving resistance of pests to control methods, and new energy problems. This has sent much of the technology back to the drawing boards. What this means is that the requirements never seem to diminish, but they are problems that are constantly changing, and there are new ones.

The local demands for research solutions or research applications are continual and seem inescapable. Yet those solutions must draw from the body of basic research results while at the same time competing for the support needed for fundamental research.

It is this reservoir of basic or high risk research relative to agriculture and food that has diminished to the critical point. This is the kind of balance that we hope can find restoration in agricultural research funding.

The consideration of a bill such as this, designed to strengthen the machinery of the agricultural science policy of the United States, is a welcome development. Re-affirmation of the importance of agricultural research and strengthening its supports are essential to the future welfare of the people of this country and elsewhere in the world.

Long-term problems of adequate supplies of agricultural products will not be easily solved. The recent shortfalls could probably be helped by a general run of favorable weather throughout the United States and the world, but problems will mount inexorably as populations and appetites increase.

We have read with considerable interest the bill introduced by Congressman Wampler and other members of the House Committee on Agriculture, and we appreciate it. We recommend serious study of all of it.

As we understand it, the bill seeks to reaffirm the research mission for the U.S. Department of Agriculture and give that mission greater strength in USDA machinery. It seeks seriously to significantly augment national support for agricultural research.

The bill proposes an administrative overlaying of the existent Federal agricultural research systems and provides for integration of contributions from a broader agency institutional and scientific base.

Ramifications come to mind, however. One that needs reiteration is the question of whether research policy and priorities should be set apart from consideration of the educational system, both formal and extension. Particularly, the integral relationship of the research effort with extension of research results requires consideration.

Agricultural research in the State agricultural experiment stations in the colleges of agriculture is very intimately related to the educational process. Research feeds the educational process. This has been said many times, but it is important to know also that the research process can be replenished only by the educational system.

We have to be concerned, within the land-grant colleges, the land-grant complex, the land-grant universities, with the education of new scientists who will carry our research in the future. What happens in agricultural research will reflect what happens in agricultural education.

As you well know, the agriculture of the United States is the sum total of agricultures of all the regions of the United States. It is in part the largely self-contained grain-livestock farms in the Midwest. It is in part specialized grain farms, ranches and feedlots of an interdependent but polarized agricultural system outside the Midwest.

It is in part grainfed and partly irrigated. It includes large numbers of orchards, vegetable farms and fish farms, dairies and poultry plants.

It is diverse, both in product and the conditions of its existence. Eventually, agricultural research will have to be applied to the local situation by scientists who know the farming and ranching and other agri-industries.

My point is that scientific acquisition of knowledge is, within itself, is not enough. Knowledge must be transmitted to decisionmakers, and in agriculture, decisionmaking is diffuse. The decisions of whether to apply a technology in food production systems are largely, though not exclusively, decisions of those who produce and harvest: the farmers and ranchers, fishermen and aquaculturists.

Somewhere along the line, as we consider the development of research, we welcome this consideration.

We need, too, to review the adequacy of the national effort in extending agricultural technology, to reassess information systems for agricultural and other renewable resources.

With the surge of information that must come, the national support of the Cooperative Extension Service System and other information systems may not be adequate for the job of rapid transmission of information that will be required.

We have ample evidence in Texas and elsewhere that a well-developed corps of agricultural extension specialists greatly multiplies the effectiveness of the agricultural research effort. We do not have data which would indicate the magnitudes of the specialists corps in other States, but we have ample evidence that research results not extended have little impact.

Research is part of a larger system of land-grant colleges. There are colleagues who will follow who will talk about this research, but I think it is important to understand that a basic reason for our research is to develop the gap between positive progress and the point of application for human benefit.

We are pleased to see that the revised version of the bill includes in its findings and purpose the importance of assurance that the results of agricultural research be effectively communicated to farmers and all others who can benefit from it. We recommend reference be made to the specific responsibilities of the Cooperative Extension Service, in communications of research results to the users. Representation on the Advisory Committee and long-range consideration of financial assistance are suggested.

Mr. Chairman, thank you for letting me talk on this subject.

Mr. POAGE. Thank you very much, Dean Kunkle.

Mr. ALDRICH. Thank you, Mr. Chairman.

Dean Kunkle has focused attention on the interrelationship between teaching, research and extension. What we will do now is proceed with the specific presentation by Dr. James Anderson, director of the Mississippi Agriculture Experiment Station on the research implications of this bill.

Mr. BOWEN. If I might, I would like to deliver a personal welcome to a distinguished constituent of mine, Dr. James Anderson. I will not challenge the Chairman's declaration about Texas A&M, but I will say that Mississippi State used to be our A&M College until we outgrew that title.

We are growing and expanding. I want to say here and now that Dr. Anderson, as Director of our Agriculture and Forestry Experiment

Station, has made a large contribution to the growth and development of agriculture, not only in our State but in the entire Nation. It is a great privilege and pleasure to have this distinguished constituent of mine here today.

STATEMENT OF DR. JAMES H. ANDERSON, DIRECTOR, AGRICULTURE AND FORESTRY EXPERIMENT STATION, MISSISSIPPI STATE UNIVERSITY; AND CHAIRMAN, LEGISLATIVE SUBCOMMITTEE OF THE EXPERIMENT STATION COMMITTEE ON ORGANIZATION AND POLICY

Dr. ANDERSON. I am grateful for the opportunity to testify in support of H.R. 11743—National Agricultural Research Policy Act of 1976. Dr. George M. Browning, executive vice chairman, Experiment Station Committee on Organization and Policy, is with me and will add comments and respond to questions after I present the prepared statement. The statement reflects the collective inputs of the 53 State agricultural experiment stations and we appreciate the opportunity to represent the group before your committee.

The State agricultural experiment stations have just celebrated the 100th anniversary of the establishment of the first station in Connecticut in 1875. During the past 100 years, the State agricultural experiment stations, working in concert with the various USDA research agencies have made outstanding contributions to the welfare of the Nation. Since these contributions are well known and widely recognized, I will not attempt to document them in this statement. Anyone familiar with agriculture in this country and in other parts of the world knows the American agriculture is the envy of the world. Increases in productivity and improvement in quality of the products produced have made the American consumer the recipient of an agricultural bounty unparalleled in the history of mankind. This bounty has enabled the American farmer to supply domestic needs at reasonable prices and also maintain an export capacity sufficient to supply much of the world's needs.

Science and technology and the application of this technology in the production, processing and marketing of agricultural products are responsible for producing the agricultural bounty we take for granted. It is unfortunate that research and education in agriculture have been the victims of declining, national support in the past decade because the world needs for food and fiber continue to increase each year. In the past, we could rely on bringing more land under the plow; however, this is not the viable alternative at the present time with present levels of technology. Therefore, the only alternative to increased productivity is to do a better job of what we are already doing well. This calls for intensifying and focusing the research effort so that maximum pressure can be brought to bear on problems needing attention.

The lack of increased Federal support during the past decade has increased the burden of support for agricultural research in the State agricultural experiment stations by the State. The Federal-State partnership has now largely become a State supported program with only 18 percent of the funds in the State agricultural experiment stations coming from Federal sources. Furthermore, inflation has made severe inroads into the purchasing power of the dollar. The result is that

there are less scientists in the agricultural research community than there were in 1965. In addition, a whole array of crash programs due to environmental demands and concerns have necessitated shifting resources to meet these needs, hence, further deterioration of the research effort in mission-oriented and basic research associated with production agriculture. The basic or long-range dimension of the research effort has deteriorated severely during the last decade. Consequently, the pool of knowledge available to the scientists engaged in mission-oriented research is no longer adequate. There is no question that additional fundamental knowledge must be generated before major breakthroughs can be made in food and fiber productivity.

The development of fundamental knowledge cannot be programmed so that it will be available when needed. If we expect to have the knowledge available to solve tomorrow's problems, we must have a sustained research effort so that it can be generated. Unfortunately, the American public does not realize that research cannot be turned on and off like a faucet and remain effective. The development and application of new and fundamental knowledge are completely dependent upon maintaining a strong research effort over a period of years.

In periods of financial stress, there is reluctance to make additional expenditures in research and education because there is a feeling that we can put the effort off to a more convenient time. This is a very short-sighted approach because the generation and application of new technology are the keys to improved financial posture. Furthermore, problems continue to mount because they are time-dependent. In the biological world, nature does not delay the problem until it is convenient to work on them. In the biological world, the scene is constantly changing; therefore, it is imperative that we revitalize our agricultural research programs so that the needed technology can be developed. It is for these reasons that we wholeheartedly support H.R. 11743 and we urge the Congress to pass and fund this needed legislation.

The problems facing the research community are exceedingly complex and their solutions will be expensive and time consuming. Also, we will never have the resources or personnel to pursue all the problems needing attention. Consequently, it is absolutely essential that problems and needs be prioritized so that the research effort can be focused on the more critical problem areas. In order to assure that the problems are properly identified and prioritized, a number of national groups have been studying the research needs of the Nation's agriculture. The most notable of these are the World Food and Nutrition Study conducted by the National Academy of Science and the Kansas City Food Conference. In addition, the directors of the state agricultural experiment stations and the administrators of the USDA research establishment have spent considerable time and effort in identifying and prioritizing research needs. Even though there was considerable difference in the format used in prioritizing the research needs by the various groups, preliminary analysis indicates that there is general agreement in the identification of the high priority areas. The research community will continue to analyze and compare the various study report recommendations with on-going research programs and also with emerging priorities. It should be noted that all

the reports indicate the necessity for improved coordination and increased support if the research community is to meet the challenges of the future.

Even though we are in agreement with the bill, there are several factors which concern us in its present form. We call these to your attention and make suggestions for your consideration.

If agricultural research is to be a distinct mission of the Department, the principal administrator needs to have Assistant Secretary status. Agricultural research and extension are so important to the Nation's well-being and it is absolutely essential that both be given greater attention. The only way to assure that this will be done is to appoint a full-time Assistant Secretary of Agriculture for Research and Education. The Assistant Secretary, utilizing existing organizations such as ARS, CSRS, FS and ES, can implement research in the areas covered by the legislation. We suggest the following language for section 3.

Section 3. (a) In addition to the Assistant Secretaries of Agriculture now provided for by law, there shall be one additional Assistant Secretary of Agriculture, who shall be appointed by the President, by and with the advice and consent of the Senate, and who shall be responsible for agricultural research and extension activities of the Department of Agriculture.

(b) Section 5315(11) of title 5, United States Code, is amended to read as follows: "(11) Assistant Secretaries of Agriculture (5)."

(c) The individual appointed pursuant to subsection (a) of this section shall—

(1) coordinate this research, and disseminate the research information, relating to agriculture, food production, and nutrition conducted or financed by the U.S. Department of Agriculture;

(2) keep abreast of developments in, and the Nation's needs for, agricultural research and extension and represent the needs of such research in deliberations in the U.S. Department of Agriculture;

(3) provide information exchange and coordination among the diverse research programs;

(4) serve as Executive Secretary of, and provide staff support for, the National Agricultural Science Board established pursuant to section 5 of this Act;

(5) perform other duties as determined from time to time by the Secretary of Agriculture.

(d) Such individual shall be provided a staff of specialists to assist him in carrying out his functions. Such staff shall be appointed pursuant to the provisions of title 5 United States Code, governing appointments in the competitive service.

In section 4(b) we suggest that a National Agricultural Science Board be appointed rather than a Policy Committee. We suggest the following language relative to the Board.

(a) There is established within the U.S. Department of Agriculture a permanent Board to be known as the National Agricultural Science Board (hereinafter referred to as the "Board").

(b) The Board shall consist of seven members appointed for a 3-year staggered term by the Secretary of Agriculture who shall serve as Chairman.

(c) The Board's responsibilities shall include, but not be limited to—

- (1) establishing appropriate means for evaluating the economic and social impact of research and extension programs related to the agricultural sciences;
- (2) reviewing programs, policies, and goals of the agricultural research and extension agencies of the Department of Agriculture and the agricultural research and extension programs in other agencies including colleges and universities;
- (3) providing a forum for the exchange of information on the plans and programs of other Federal agencies sponsoring research and education programs related to agriculture; including information provided by the Federal Council on Science and Technology;
- (4) establishing and developing national policies, priorities, and strategies for agricultural research and education for both the short and the long term for consideration by the Department of Agriculture and other agencies, and institutions conducting agricultural research;
- (5) reviewing and making recommendations with regard to the allocation of funds for the programs of research and extension authorized by the Department; and
- (6) to assist the Board in the performance of its responsibilities, the Secretary shall establish and maintain an agricultural research and education planning committee which shall include appropriate representatives from the Land-Grant and other Colleges and Universities, and other non-Federal organizations having significant programs in the agricultural sciences.

(d) For purposes of this Act, the term "agricultural research" shall include but not be limited to, those activities described in section 1 of the Act of June 29, 1935 (49 Stat. 436).

(e) While away from their homes or regular places of business in the performance of services for the committee, members of the committee shall be allowed travel expenses, including per diem in lieu of subsistence, in accordance with applicable laws.

(f) In the event a vacancy should occur on the committee, it shall be filled in the same manner as provided in subsection (b) of this section.

(g) No later than January 31 of each year, the Board shall submit to the President and Congress a report on its activities during the preceding fiscal year which may include the separate views of members of the Board. The second annual report shall include a 10-year plan for agricultural research and extension, such plan to be updated every 5 years and subject to review by representatives of appropriate user groups selected by the Secretary prior to submission. The first report shall be due following the first complete fiscal year after the enactment of this Act.

I see no difficulty with any other parts of your bill with the exception that in section 7 you have included far too much for competitive grants (essentially soft money) as compared to what you have proposed for additional funding of existing programs (hard money). Our suggestion would be as follows:

Section 8—It is the sense of the Congress that before the authorizations provided in section 7 are appropriated, the Federal funding for agricultural research programs existing and funded on the date of enactment of this Act be increased to \$100 million

for the fiscal year ending September 30, 1977; \$150 million for the fiscal year ending September 30, 1978; and \$250 million for the fiscal year ending September 30, 1979.

Relative to our recommendation that support to existing agricultural programs be increased by \$100 million for fiscal year 1977, we are of the opinion that the request already made by the State Agricultural Experiment Stations, Colleges of 1890 and Tuskegee and the Association of State Universities' Forestry Research Organization is substantially on target, i.e., an increase of \$47,196,840 for fiscal year 1977. If the Agricultural Research Service, the Economic Research Service, the Forest Service and the Farmer Cooperative Service were to be provided a total increase of \$53 million we would all be essentially on target with the \$100 million which we have suggested. In this connection, we have included herewith page 11 from the request made by the Legislative Subcommittee of the Experiment Station Committee on Organization and Policy to the Office of Management and Budget under date of Friday, September 19, 1975.

In conclusion, I want to stress the need for the inclusion of nutrition and forestry research and suggest that the language of the bill make certain that both of these areas are included. My reasons are as follows:

Nutrition Research—Nutritionally inadequate food consumption still prevails among a high proportion of the American people. Nutritional status varies among different economic, ethnic, sex, and age groups. Previous work has focused on the needs of preadolescents and young adults; however, there is still need to study groups such as pregnant women, infants, preschool children, and the elderly. It is necessary to learn how food patterns are developed and how they can be adopted to be more satisfying and nutritionally adequate. This would serve as a basis for nutrition education programs including efficient utilization of food stamps as a resource.

The current technical, economic, social and political changes have been swift and their effect on consumers is highly complex. For example, economic shifts on the cohesiveness and continuity of families are important research concerns. The improved use of human and material resources such as food, clothing, and housing becomes more crucial as family incomes experience more inflationary pressures. Sound information is needed regarding the ways which families respond to economic pressures—reallocation, delayed expenditure, re-location. Such information could result in more effective management of total consumer resources including wiser selection of food at lower prices. Limited-resources families, young families, and senior citizens would be important populations for these research projects since their purchasing power has been eroded severely.

Forestry Research—Demands for goods and services from the forested lands of the United States have been increasing at a rapid pace, and all projections of future requirements indicate a pressing need for research on a broad and comprehensive scale. If consumer prices for building materials, paper products and wood-based chemicals are to be maintained at or near current levels, methods must be found to increase the productivity of our forests and to use this production more efficiently.

Timber supply concerns assume increased importance when viewed in the context of established national policy with regard to environmental enhancement and energy conservation. Wood products are much less energy-dependent than competing materials, and their renewability must not be overlooked. Increased production of wood products, however, must be maintained without damage to the environment, and with due regard for non-consumptive uses of the forest resources. Outdoor recreation, green space, wilderness, watershed protection and wildlife habitat enhancement seem likely to continue to reduce commodity production from much of our forest land. Research can develop ways to meet these many conflicting demands and thus increase the contributions of our forests now and in the future.

Again, we deeply appreciate the opportunity to comment on H.R. 11743. If we are able to pass this legislation, it will go down in history as one of the more significant achievements of this century. We commend the sponsors of this significant legislation.

FISCAL 1977 BUDGET REQUEST

The following budget request (Table 1) having been authorized by the Agricultural Research Policy Advisory Committee (ARPAC) at its February 1974 meeting, and discussed at the 1974 Summer meetings of the Experiment Station Directors in each of the four regions, and by representatives of the Colleges of 1890 and Tuskegee, as well as by the Home Economics Subcommittee of ESCOP and by ASCUFRO is hereby presented for approval. Authority for making this presentation before the Executive Committee, National Association of State Universities and Land-Grant Colleges was granted by the Executive Committee, Division of Agriculture, NASULGC on November 19, 1974, at which time the following budget request was approved by the Division:

TABLE 1

INCREASE IN FUNDS REQUESTED FOR SUPPORT OF RESEARCH PROGRAMS IN THE STATES FROM FEDERAL SOURCES [CSRS], FISCAL YEAR 1977

Item No.	Component	Increase Requested
1	Increased Operating Costs	¹ \$10,376,190
2	Improved Productivity of Crops	7,900,000
3	Improved Productivity of Livestock & Poultry	5,300,000
4	Improved Environmental Quality and Conservation of Natural Resources	6,715,000
5	Food and Human Nutrition	2,875,000
6	Family Living	2,000,000
7	Improved Timber Supply and Use of Forest Land	3,500,000
8	Rural Development	7,060,000
9	CSRS Administration	1,470,650
Total		² 47,196,840

¹ Includes a 10 percent increase based on fiscal year 1976 appropriation to maintain programs at current level: Hatch \$8,215,390; McIntire-Stennis \$746,200; Colleges of 1890 and Tuskegee \$1,270,600, and Rural Development \$144,000.

² This total (exclusive of the amounts included for increased operating costs, CSRS administration, and Specific Grants under Public Law 89-106) amounts to \$31,850,000, which is essentially one-third of the three-year total authorization suggested to the State Agricultural Research Institutions by the Executive Committee, NASULGC, at the November, 1973, meeting of the Association at Denver, Colo.

Mr. ALDRICH. Following Dr. Anderson, we will now call for comments about how this relates to the Extension dimension of the program.

We have Dr. Roland H. Abraham from the University of Minnesota.

**STATEMENT OF DR. ROLAND H. ABRAHAM, DIRECTOR,
AGRICULTURAL EXTENSION SERVICE, UNIVERSITY OF MINNESOTA**

Dr. ABRAHAM. My name is Roland Abraham, Director of the Agricultural Extension Service of the University of Minnesota, and here to speak on behalf of the Extension Committee on Organization and Policy. We are appreciative of the opportunity to testify in support of H.R. 11743, the National Agricultural Research Policy Act of 1976. My statement reflects the views of the Policy Committee of the Directors of the Cooperative Extension Services of the Land-Grant Universities.

Ever since the establishment of extension services in the early part of this century, the findings of the research workers in the U.S. Department of Agriculture and the State agricultural experiment stations have been the keystone in the efforts of extension workers to help the farmers of our country improve their husbandry. Over and above the contribution to domestic food supply are the contributions which these efforts have made toward the world's food needs and incidentally building our domestic balance of payments. Many competent observers of the progress of American agriculture to its present high productive level have expressed the view that this progress is the result of the combination of progressive farmers, service enterprises, and the research-extension team. Extension workers have drawn upon the experiment station and the USDA research in developing recommended practices which producers can employ in their farming operations. In turn, extension workers in concert with producers have identified problems requiring further investigation and reflected these to their experiment station colleagues for study.

Because we regard the continued flow of research so vital to continued high levels of efficient production of food and fiber in American, extension directors believe the significant step envisaged in H.R. 11743 should be taken to more nearly assure the continued flow of improved agricultural technology from the research in conducting nutrition education leads us to the view that continued and, hopefully, expanded research in human nutrition to undergird our extension programs is likewise important to the well-being of American people, and others around the world. Therefore, we wholeheartedly endorse the principle of support for maintenance and growth of agricultural and nutrition research which would be afforded by the proposed Agricultural Research Policy Act of 1976.

Optimum pay-off from this added investment in research requires a strong cooperative extension system in the States to interpret and disseminate new information. Thus we believe it is important and necessary to recognize the need for such resources as will enable cooperative extension services in their assigned role of interpreting and conveying to farmers and other users, in applicable form, the results of expanded and intensified agricultural and nutrition research. Specifically, this will be important to maintain the productive capability of the research-extension team. Beyond the communication and

dissemination of new information by extension, there continues the need to convey presently known production practice recommendations to new farm operators and to those who are not yet utilizing known information. This is also true for homemakers and others with respect to information bearing on human nutrition. Therefore to assure greatest national dividends from the research which would be fostered by H.R. 11743, we recommend that similar resources be provided to maintain and improve the capability of the State cooperative extension services to perform their traditional dissemination and educational role under existing legislation and guidelines.

Again, I wish to express the appreciation of State extension directors for the opportunity to speak in support of the proposed Agricultural Research Policy Act of 1976 and of the need for corollary adequate support for the cooperative extension function.

Mr. ALDRICH. Mr. Chairman, in the same fashion that research underlies, the supply of information which has moved via extension to the practicing agriculturalists, so does research and scholarship undergird the undergraduate as well as graduate teaching function of our institutions.

To comment about this in relationship to present instruction, I would like to introduce Dr. Charles B. Browning, dean of resident instruction, College of Agriculture, University of Florida, Gainesville, Fla.

STATEMENT OF DR. C. B. BROWNING, DEAN, RESIDENT INSTRUCTION, INSTITUTE OF FOOD AND AGRICULTURAL SCIENCES, UNIVERSITY OF FLORIDA, CHAIRMAN-ELECT, RICOP

Dr. BROWNING. The Resident Instruction Committee on Organization and Policy (RICOP) would like to go on record as supporting H.R. 11743, 11744, the "National Agricultural Research Policy Act of 1976." We would like to commend Congressman Wampler for his leadership in bringing to the attention of the Committee on Agriculture the "findings" set forth in the bill—particularly the fact that agriculture and agricultural production are indeed "a national resource and should be supported by a strong system of agriculturally related research." In addition, we would like to bring to the attention of the House Agriculture Committee several things we feel are of extreme importance and directly related to this proposed Act.

Agricultural research is important—for all those reasons indicated in the proposed bill and many others. But of just as much importance to this "national resource-agriculture" are the educational programs that prepare scientists and engineers with the training and education necessary to conduct agricultural research. These educational programs are not only important, but indispensable. We hope to communicate to the House Committee on Agriculture in the following brief passages some of the things we think are important to have, for the most part, been overlooked or ignored in the national effort to support agricultural research and education.

The teaching programs in our schools and colleges have grown in size and importance in concert with the growth and development of the companion Agricultural Experiment Stations during the past 100 years. This is a relative comparison since the teaching programs generally make up only 8-12 percent of the total agricultural Research-Extension-Teaching budget within a State.

Undergraduate student enrollment in agriculture and related programs in the 70 member institutions of the NASULGC increased approximately 160 percent from 1963 to 1975. The long-term trend in enrollment is shown graphically on an attachment. In the fall of 1975 there was 92,161 undergraduates compared to 81,736 in the previous year—a 12.8 percent increase. Not only have our enrollments increased but our educational mission has changed—become more complex. In addition to our curricula dealing with a highly technical production agriculture, our programs must continuously adapt to an expanding need relating to the marketing, processing, and distribution of food and fiber. Information relating to the compatibility of agriculture and a quality environment, conservation of natural resources, and proper utilization of renewable natural resources must be translated into viable educational programs to meet the needs of our students.

With less than 6 percent of this Nation's population engaged in production agriculture some might find it difficult to understand these enrollment increases. However, with numbers in production agriculture steadily declining the importance to the Nation and the world of the training and ability of these few become more important than ever. In addition, the educational programs of all the agriculturally related activities become more numerous and important in our ever-increasing complex society. It is important to recognize also that the students coming into our programs, although better prepared educationally, are less well prepared in terms of their background experiences and knowledge of agriculture. Another change of importance is that more than 25 percent of the students enrolled in our programs are women.

Graduate student enrollments in agriculture and related sciences increased 15 percent from 1974-1975 with a total of 27,717 in our 70-member institutions. These graduate education programs training and educating our agricultural scientists and extension specialists are truly a national resource—the only source of the scientists required to keep our research current if we are to provide the technology necessary to meet the food and fiber needs of this country and world in the future, and if we are to continue to have the trained manpower for our effective technology dissemination system the Agricultural Extension Service.

Although the bulk of agricultural research is performed in Agricultural Experiment Stations associated with our State universities and land-grant colleges, other institutions such as the USDA and private industry are also involved in research and development. But only our State universities and colleges are engaged in the graduate education programs so vital if we are to continue to meet the manpower needs in terms of well trained and educated agricultural scientists and engineers. There is no other source of this manpower. It is also important to note that if this Nation is to make an impact on the food and fiber needs of the emerging nations of the world, one of the most important and effective ways will be through graduate education programs for foreign students so that they may return home with the knowledge and ability to improve food production in their countries. Technology transfer without trained manpower in-country is not adequate nor successful. Even though Federal dollars have

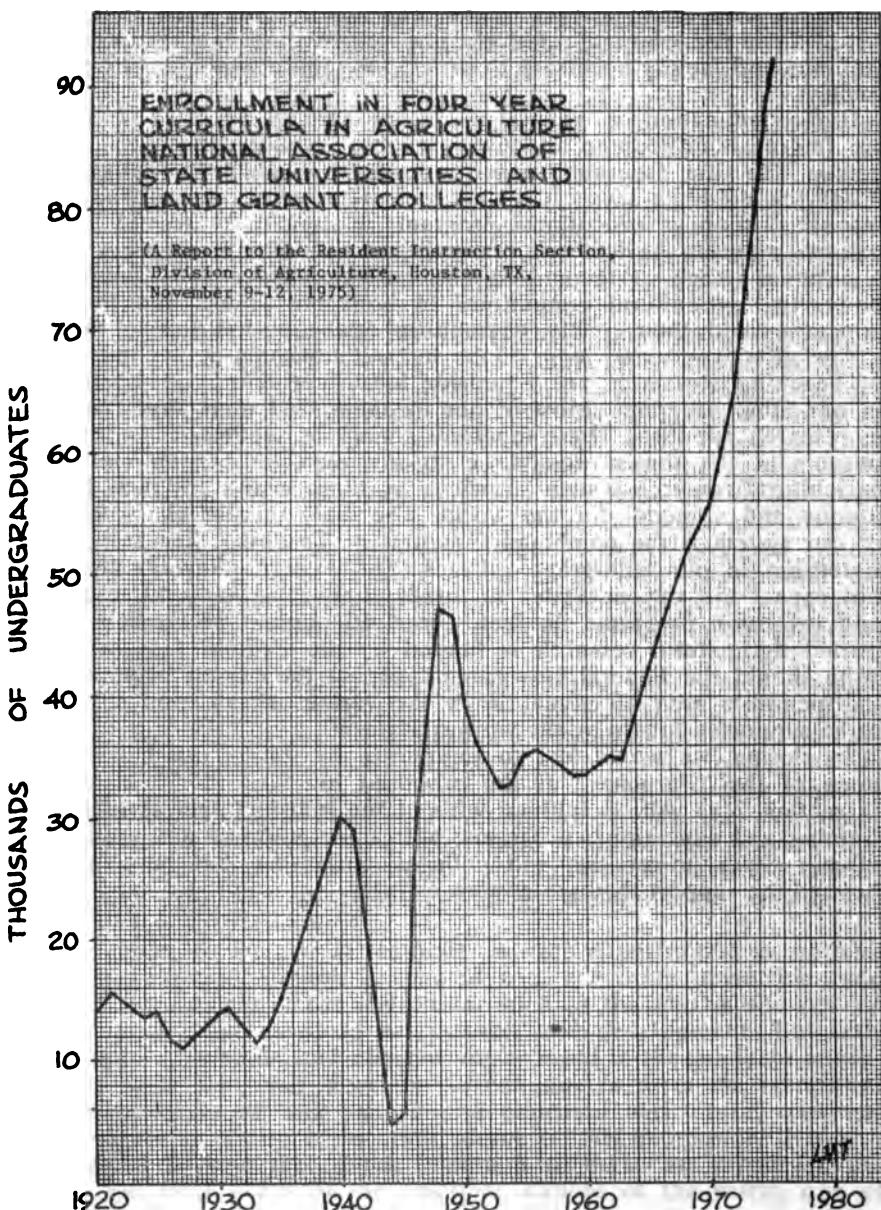
supported these foreign student education programs through U.S. AID and similar activities, it must be recognized that individual States have shared a large portion of this expense through such things as out-of-State fee waivers, relatively low tuition cost and the physical facilities and faculty necessary to provide for these educational opportunities.

Higher education, in general, is facing difficult times. The States are finding it difficult to adequately support quality educational programs. The first programs to suffer have been and will continue to be at the graduate level. It would seem reasonable that a "national resource" such as educational programs in agriculture should justify national support. Agricultural research and agricultural extension have a national image—a recognized national importance and a national body. the agricultural committees of both the House and Senate, concerned with their vitality. Agricultural education has none of these.

The effectiveness and logic of the interrelationships of the functions of Teaching, Research, and Extension have been amply demonstrated in our State programs. Most of our teachers hold joint appointments as research scientists. These functions cannot be separated if optimum outputs at the lowest possible costs are expected. Oftentimes our agricultural research system is viewed by those who study it as being unique and a model for the world. The truly unique characteristic of our system is the combined functions of Teaching, Research, and Extension in our land-grant colleges. The Federal Government does not expect the various States to totally support agricultural research and extension programs. In fact, about 60 percent of publicly supported agricultural research is funded by the Federal Government. Why should the Federal Government expect the closely related and indispensable area of education in the various agricultural sciences to be supported totally by the various States?

In closing, we would like to summarize by stating our belief that none of the "Purposes" of the proposed bill No. 11743 as stated in section 2(a) will be fulfilled without the indispensable agricultural training and educational programs, both undergraduate and graduate, of our State universities and colleges—programs that have grown beyond the support they are now receiving.

Form E-2



Mr. ALDRICH. Mr. Chairman, as the concluding witness of our group, I would like to present Dr. Coyt T. Wilson, Director of the Experiment Station of Virginia.

Mr. WAMPLER. Mr. Chairman, I would like to have the honor and privilege of formally introducing Dr. Wilson. He is a constituent and friend of mine. I hold him in very high regard because I think his credentials are impeccable in the area in which he testifies.

He is director of the Virginia Agriculture Experiment Station of the Virgina Polytechnic Institute and State University at Blacksburg, Va.

We are delighted to have you here with us this morning.

STATEMENT OF DR. COYT T. WILSON, DIRECTOR, AGRICULTURAL EXPERIMENT STATION, AND EXECUTIVE ASSOCIATE DEAN OF RESEARCH DIVISION, VIRGINIA POLYTECHNIC INSTITUTE AND STATE UNIVERSITY, BLACKSBURG, VA.

Dr. WILSON. My name is Coyt Wilson. I am the Director of the Virginia Agricultural Experiment Station. I thank you for the opportunity to appear in support of H.R. 11743 entitled, "The National Agricultural Research Policy Act of 1976."

In Virginia we have 150 full-time-equivalent (SY) research faculty. The salaries of these people are provided, for the most part, by State, Hatch, RRF and McIntire-Stennis funds. In recent years appropriations from these sources have not increased enough to meet increased costs due to inflation. Consequently, funds for research equipment, supplies and materials, supporting personnel and other operating costs have declined. In Virginia, as in other States, we have had to rely more and more on project grants for support. Most Federal agencies that make grants for research are reluctant to support research on agricultural production, harvesting processing, and marketing. Funds appropriated under this Act would significantly increase the productivity of the scientists at the agricultural experiment stations.

I would like to cite two examples from the Virginia Agricultural Experiment Station that illustrate the need for additional funds to increase the productivity of the scientists involved.

The first deals with biological control of musk and curled thistles in the mountain pastures of southwestern Virginia. We have more than 125,000 acres in Virginia infested with these weeds. They can be controlled with chemical sprays but this is expensive. The expense becomes prohibitive in those areas where the sprays can only be applied by hand or by helicopter. A few plants on a steep rocky slope can reinfest adjoining areas that may have been cleared of thistles by chemical sprays.

Our scientists have found three weevils that are able to reduce the thistle population to acceptable levels. One of these feeds on the seed heads. In 1969, 100 adult weevils (*Rhinocyllus conicus*) were released on a farm of approximately 1,400 acres located in Pulaski County. By 1975 thistle density had been reduced by 95 percent this is acceptable control. A second weevil (*Centhorhynchidius horridus*) feeds on the roots of the thistle and kills the plants in the rosette stage. Both of these weevils have been cleared for release. A third weevil that shows promise is being studied under quarantine.

Additional funding is needed to develop a method of rearing these weevils in large numbers under controlled conditions. This will involve the development of a synthetic diet and the establishment of optimum temperature humidity and lighting conditions for production of the weevils at the correct time which for the head feeding weevil is at or just prior to blooming. At present weevils are collected in late summer when they are numerous and carried through the winter on potted thistle plants. Requests from farmers for weevils for release in their pastures far exceed the number of weevils that can be carried through the winter. If mass rearing techniques can be developed, it is reasonable to assume that the weevils will be reared commercially and sold to farmers.

The second project deals with the question of agriculture's contribution to surface and ground water pollution. At Blackstone, Va., we have established a new branch research station. At this location we have three 100 acre watersheds on which no agricultural activity has occurred during the last 35 years. We have instrumented these watersheds and are currently collecting surface and ground water samples at frequent intervals and analyzing for nitrate, nitrite, phosphate and pesticide levels. Our laboratory support for this project is not sufficient to analyze the samples as fast as they are being collected. Thus, we are accumulating a backlog of samples. After we have accumulated sufficient base data we will plant row crops and grasses on two of the watersheds. The third one will remain undisturbed.

Records will be kept of all fertilizer and pesticide applications and these will be precisely recorded with respect to a three dimensional grid system which will include information on soil type and slope of the numerous sub-plots in each watershed. Records will be kept on frequency, duration and intensity of rainfall. This project will be continued until sufficient data are available to permit the development of a computer model that will predict the level of various pollutants in surface and ground water that can be expected from various agricultural activities. This model will then be field tested on one or more watersheds consisting of several thousand acres.

We expect that in the future there will be increasing restraints on the use of agricultural chemicals. We need the information that this research will provide in order to develop recommendations that will permit the use of these chemicals without lowering the quality of the surface and ground waters on the watersheds where the chemicals are applied.

Mr. ALDRICH. Mr. Chairman, that concludes our formal presentation.

We are prepared to answer any questions that may be directed to us.

Mr. BOWEN. Dr. Anderson, I was impressed with your analysis of the bill and your frank statement which I think is very welcome on the part of witnesses.

As co-sponsor of this bill, I am sure Mr. Wampler and all of us are here as part of the executive process and so we are ready to hear some criticism.

I would like you to tell me in a little more detail what you feel, in terms of the replacement board for the committee structure here, are some of the basic limitations and weaknesses of the committee structure as written into this piece of legislation.

Dr. ANDERSON. The first, and probably the greatest weakness in the committee structure as it exists is this: You are asking the people who work under the Secretary to be his major advisory board.

In my opinion, it would be much more effective to have an outside group as the major advisor to the Secretary of Agriculture.

This is simply because he has our advice at his disposal now. We meet with him regularly, several times a year.

Many of the people on the presently constituted committee are within his own organization, so, for that reason, I think the advice coming from an outside group would just be more effective.

Second, the advice coming from the outside group would probably be less biased than the advice that an in-house group would give the Secretary. I do not like to say that we are self-seeking, but let us be realistic. We are.

Those would be the two major reasons that we feel the committee or the board should be constituted and that it should have sufficient stature to indeed influence the Secretary.

Mr. BOWEN. As I look down the line-up, I notice that it says "two representatives of the USDA and one from the Cooperative State Research Service," and then the rest of them appear to be spread throughout other sectors.

Dr. ANDERSON. There is some representation, yes, sir, as presently constituted.

Mr. BOWEN. Do you feel it is weighted a little too heavily toward the departmental representation?

Dr. ANDERSON. Yes.

Mr. BOWEN. Let me ask you one further question regarding the grant structure.

I notice you were a little critical of the grant sections 6 and 7.

I take it that you feel that specific competitive grants directed toward specific missions—let us take, for example, some work you are doing at Mississippi State, boll weevil research, and other areas also—that is useful so long as you have adequate underpinning for the basic institutional work.

Is that correct?

Dr. ANDERSON. Let me clarify here.

I am not in any way critical of the grants. I am simply saying that, in order to respond to a grant efficiently, you must have an undergirding base on your research program.

I think the grant is an effective way to focus research effort on critical problems. We certainly could absorb grants within our station now.

I do not feel that probably the total research establishment could absorb the grants in the magnitude without some undergirding of the existing program.

Mr. BOWEN. It is a question of balance.

If we have so many dollars to spend, then do you think it may be a little weighted too heavily toward the grants and not heavily enough toward basic structure and research?

Dr. ANDERSON. Yes.

The CHAIRMAN. Will the gentlemen yield?

Dr. Anderson, did I understand you to say that you felt that having two representatives from the Department of Agriculture out of a total of 15 members gave the Department too much influence?

Dr. ANDERSON. What I am referring to is this. There are two out of the Department and there are also four—I consider the group from the State agriculture experiment station as a part of the in-house folks, too.

The Secretary has my advice and counsel without me being on the board.

So, I consider not only the folks within the in-house agricultural establishment, but those of us connected with the State agriculture experiment stations, the extension services, the Association of State Universities and Forestry, and research organizations. We are all part of the same group.

Maybe I should have said the research community.

So I am really asking that the board be constituted largely from membership outside of the research community.

The CHAIRMAN. At the present time, the total number from the research community is six?

Dr. ANDERSON. I would say 7 to 15.

The testimony says seven, but we are quite flexible. The number is not as important as the other.

The CHAIRMAN. I understand that Mr. Wampler plans to offer an amendment providing, under (b) on page 6, for four representatives from that group. Together with the two from the Department of Agriculture, that would be a total of six members from the Agriculture research community. Although the total number to be on the board is now 15, Mr. Wampler intends that that number be increased to 18.

So two-thirds of the board members, under that construction, would come from outside the agricultural advisory group.

Do you think that that would be appropriate or is it still to heavily influenced by the Agricultural Research Community?

Dr. ANDERSON. My major concern is that this board would indeed have the stature and the authority to accept what the Secretary of Agriculture says.

It is a little bit like this. The President has my counsel at my university any time he wants it. But it just so happens that folks out across the State are a little more effective in getting this attention sometimes than I am.

It is in this sort of thing. Here again we do have selfish interest here.

Perhaps a complete look from the outside may upset the priorities and establish the goals a little more effectively.

The CHAIRMAN. I understand and appreciate what you are saying, but I do not think it should be assumed that the Agriculture Research Policy Committee in every instance will be meeting with the Secretary personally. I would think it more likely that they would meet together, make a determination, and then make a joint recommendation to the Secretary.

Is it not also important that the committee have, among its constituent members, a broad enough representation from the agriculture research community so that, as they carry on policy discussions with representatives of the National Science Foundation, the National Academy of Sciences, the Environmental Protection Agency, consumer and farmer's groups, environmentalists, and so on, the point-

of-view of the research community would not lose or lack sufficient backing within the Policy Committee.

Dr. ANDERSON. Let me respond by having you look at this chart.

The ARPAC group would have direct entry into this board also. I look on the ARPAC group as the in-house people in State agriculture. We are the implementing group. We are going to have the contract here with the board.

The CHAIRMAN. Thank you very much.

I take it that you are not worried that you are going to lose an appropriate opportunity to present the views of the research community.

Mr. POAGE. Mr. Chairman, on this point, without trying to be cynical, I wonder if you would give us an idea of what the public thinks the creation of boards and commissions is, in general?

What is your impression of the public's idea about the Congress creating more and more boards and commissions?

Dr. ANDERSON. Mr. Poage, I do not have any particular idea. I generally think of a board as being a little more powerful than a committee.

Mr. POAGE. I am talking about a board or commission. I am talking about agency, whether advisory or whatever.

What do you think the public's general feeling is about these boards?

Dr. ANDERSON. If I were making an assessment now, I would say that the public would not have any objection to the board because there is a feeling—two boards—because there is a feeling across the country that indeed the executive as well as the Congress needs to be spoken to more by the representatives of the people than these boards, and these boards come from the people out here. So I would say it would be favorable.

Mr. POAGE. I do not want to drag this along, but, Dean Kunkle, do you believe that is true? Do people in Texas not have objection?

Mr. KUNKLE. Mr. Poage, I think you know the situation in Texas. There is considerable fear of the increasing bureaucracy. This does not mean that valuable boards are not needed.

The CHAIRMAN. Mr. Wampler?

Mr. WAMPLER. First of all, I want to say that it is not often that this committee has the privilege of having such a fine panel of witnesses to appear before us. I do want to thank each of you individually for your presence here and for your excellent testimony.

Dr. Anderson, most of your remarks were directed to the specifics of the bill. For that reason, I would like to ask you a question or two.

You do indicate strong support for the designation of the Assistant Secretary of Agriculture for Research and Education to help carry out the purposes of the bill.

Is that correct?

Dr. ANDERSON. That is correct, sir.

We feel that is an essential part of the bill. We wholeheartedly endorse that section.

Mr. WAMPLER. You may recall in one of the earlier drafts of the bill, we provided for a principal administrator to serve under the Secretary for the purposes of carrying out the bill.

There were a number of comments offered on that bill, and this seemed to be a strong recommendation just as you appear to feel strongly about it. For that reason, we did designate an Assistant Secretary of Agriculture for that purpose. Assistant Secretary Long opposed the bill, and one of the grounds on which he opposed it was that he felt this was an undue infringement by the legislative branch of the government on this prerogatives of the executive branch.

But, I am sure you are aware that there is ample precedent for this because the creation of an Assistant Secretary of Agriculture for Rural Development was basically the result of the Congressional initiative.

Now, I have some criticism of the way that program is being implemented, but I certainly have no criticism of the fact that we have an Assistant Secretary designated for that particular purpose.

Also, Dr. Anderson, you commented on that phase of the bill relating the authorization. You referred specifically to section 8 of the bill and indicated that you thought that perhaps it was weighted too heavily toward what you termed essentially soft money—section 7 and section 8. One provides for the grant program, the competitive grant program, and the other is the authorization for appropriations.

Section 9 is a recommendation for additional funding of the existing programs, while it is in the form of a sense of Congress resolution. I recognize that a sense of Congress resolution may be meaningful to some and not to others, and for the last several days I have been giving it some thought.

There is the possibility of adding and changing section 9.

Let me try this out and see how it would fit into your concept of where the priorities ought to be.

If we should retain the authorization in section 8 for \$50 million for fiscal year 1977, \$100 million for fiscal year 1978, and \$250 million for fiscal year 1979, that is, to carry out the competitive grant program.

In addition thereto, we would substitute, rather than have the sense of Congress section, we would say that, for fiscal year 1977 there will be an additional \$100 million authorized to carry out the ongoing programs; and fiscal year 1978, \$150 million; and fiscal year 1979, \$250 million, as you have suggested we might do.

What this would mean, then, is that in fiscal year 1977, there would be a total increase of an authorization of \$150 million; in fiscal year 1978, an increase of \$150 million; and in fiscal year 1979, an increase of \$500 million. That is, over existing levels of funding.

Would that bring it into closer proportion, do you think, in balance?

Dr. ANDERSON. I think this would be entirely satisfactory from the standpoint of the research community.

Our major concern is that the legislation or the funding does not override us with temporary grant-type stuff. If we find ourselves in the position of not being able to respond and do an effective job, then this is true if we had not been so debilitated over the past several years without adequate funding. We would probably be able to move into the grant proposals, as you have indicated there in section 7.

This would be agreeable to us.

Mr. WAMPLER. Of course, we always run the risk of being accused of being budget-busters when we propose authorizations of this level. You understand there is a difference between the authorization and the appropriation process.

I think there is some responsibility to again designate what I think is one of the principal missions of the Department of Agriculture, and that is the dissemination of information to farmers and others, and to do research.

As I understand, also, there has been a recommendation of your group that, if we were to increase the authorization of funding for fiscal 1977 to \$100 million, about 47 percent of that would go for cooperative agreement programs, and 53 percent for ongoing or in-house research.

Is that correct?

Dr. ANDERSON. That is correct.

Our reason for this suggestion is that we have made up our budget. We present it to the Office of Management and Budget. We will present it shortly to the Congress in the spring, and we call for \$47 million. So we would be on target so far as we see our ability to absorb new money, and respond effectively to the challenges out there.

Mr. WAMPLER. Also, it would be reasonable to assume that the two succeeding fiscal years you would probably maintain a level akin to that?

Dr. ANDERSON. We are beginning to look at the projections for the 1978 fiscal requests now. They are not firm. We are talking about somewhere between \$45 million and \$60 million. This is not firmed up yet.

I would assume that the board would be in place by this time and probably would have made a detailed analysis of not only the problems out here but where the capabilities exist in 1978 and 1979. Then the board input would indeed be effective in saying that the state stations need, for example, \$60 million or do they need \$35 million?

The board would begin to exercise its responsibility.

Mr. WAMPLER. Thank you.

The CHAIRMAN. Mr. Krebs?

Mr. KREBS. Mr. Chairman, I would like to apologize to Mr. Aldrich for my tardy arrival.

I am very glad that I graduated from the University of California in 1950. I probably would not have made it after this fiasco.

I am a little confused by the request or suggestion by Dr. Anderson, as emphasized by the exchange which took place between him and the gentleman from Virginia, Mr. Wampler. They talked about a greater emphasis for funding existing programs.

It certainly would appear to me that there is much merit in what you are saying.

What does concern me somewhat is this: This is where my schizophrenia probably enters into the picture. I have certain loyalties to the University of California, but also represent a very fine educational institution in my district known as California State University, Fresno, which I think by any standards has an excellent agriculture department.

There has been some concern in this committee, which has been expressed not only by myself but also by others, and as recently as yesterday by the vice chairman, about what has been perceived by some of us as the exclusion of non-land-grant universities from Federally supported agricultural research projects.

I wonder how you could make jibe your understandable desire for greater emphasis on funding of existing programs and opening the door somewhat to non-land-grant universities for participation in agricultural research?

Dr. ANDERSON. So far as I am concerned, Mr. Krebs, I feel like the problems facing research communities are such—of such magnitude and complexity—that there is ample opportunity to utilize the existing talent wherever it is.

I do not think it is reasonable for us to expect, as we look at the needs facing American agriculture, to assume that all its problems are going to be solved at the land-grant communities. So I certainly would have no objection to opening this up, but I think that what we would need to do is, as I implied, to see that this board would be concerned about capabilities matching problems—not only problem needs, but also capabilities.

I certainly do not, and did not, mean to imply that my testimony would restrict it to the land-grant universities.

Mr. KREBS. May I have one more brief question, Mr. Chairman?

The CHAIRMAN. Yes.

Mr. KREBS. Dr. Anderson, you expressed some concern about the make-up of the committee, and you discussed it at some length with Mr. Wampler.

I have a specific question.

I note here that in the suggested representation, there is absolutely no representative from a segment that is deeply involved in the farming operations of this country, i.e. labor.

I see ample representation from the national farmers' organizations and from agriculture trade associations. I am not sure I understand the difference.

But I see no representation at all from labor.

My question to you is this. Do you feel that a representative from labor, provided, of course, he is qualified, would be an asset to such a committee?

I am directing this to you and other members of the panel, if they desire to respond.

Dr. ANDERSON. In our presentation here concerned with the board, we did not indicate who the membership should be. Certainly labor is an important aspect. So are a number of consumer groups. I would assume that both of these would be represented, especially if you expand the membership of this board to some 15 members.

It should be those segments of the total society who are interested and are dependent on agriculture. This includes many.

Mr. KREBS. Without meaning to be critical of the author of the legislation, whom I consider to be a friend, do you not think that this represents a glaring omission?

Dr. ANDERSON. Mr. Chairman, I would rather not comment inasmuch as I have suggested it be done away with.

Mr. KREBS. Thank you.

The CHAIRMAN. Mr. Hightower?

Mr. HIGHTOWER. I apologize to the Chair and to Dean Kunkle because I arrived after he was introduced and presented. I am sure that Congressman Poage did an adequate job of that.

I cannot resist the temptation to respond to my colleague, Mr. Bowen, in his introduction of the gentleman from Mississippi. He said that they had outgrown the title A&M. In Texas, the title grew along with the importance of Texas A&M University and the community in the State of Texas.

Dean Kunkle, in your prepared remarks, toward the end you made this statement: "We recommend reference be made to the specific responsibilities of the cooperative extension services in communications of research results to users."

As you know, and, of course, having worked with you for many years, we are very interested in the extension service.

I wonder if you could elaborate just a little right there on that particular comment? I am not sure I understand just what you said, and what you were intending to communicate to us there.

Mr. KUNKLE. My intent was simply this.

In the philosophy that developed in the National Research Act—Agriculture Research Act—this very important aspect of extension, particularly the importance of the cooperative extension services, being noted in a philosophical statement.

It is a matter of keeping something in mind. It is a matter of keeping the interrelationship in mind.

As this develops, the possibility of targeting this interrelationship may become more and more important.

Mr. HIGHTOWER. Would you suggest any change in this legislation which would improve or extend the emphasis on the distinction as far as the legislation is concerned?

Mr. KUNKLE. I would hope that this legislation, as I have said in the prepared comments, the Congress would recognize the eventual need to consider this aspect and to do something about the gap between the research progress and application.

As research increases, we do know that—the extention must also follow pace.

It is a matter of getting this thought into process of evolution as to what happens as this act is implemented.

Mr. HIGHTOWER. Thank you, Mr. Chairman.

The CHAIRMAN. Mr. Bedell?

Mr. BEDELL. Dr. Anderson, you indicated that you submitted your proposed budget to the Office of Management and Budget. Was that correct?

Dr. ANDERSON. Yes.

Mr. BEDELL. To whom do you submit it? Is that the only place you submit your budget?

Dr. ANDERSON. We usually have a meeting with the Secretary of Agriculture some time in the summer.

We just visit generally about the budget.

Of course, then the 53 experiment station directors have what they call a legislative subcommittee which is responsible for developing a budget. This budget goes to the Office of Management and Budget. Later on, it is presented and hearings are held with the subcommittee—the appropriations subcommittees of the Congress.

The Secretary of Agriculture is aware, and in general there is considerable disagreement in our budgets than what the Secretary's is. But we do not have access to his until the executive releases it.

Mr. BEDELL. Is this a general practice? That is, is it a general practice that on the research budgets of the different universities, those would be submitted not to the Department of Agriculture but really the Office of Management and Budget? Is that customary?

Dr. ANDERSON. Research and extension budgets go this way. There is a hearing in the OMB and in the Congress.

Mr. BEDELL. If we pass this legislation, would this change that so that it would then be the Assistant Secretary of Agriculture who would be charged with this and who would have more responsibility for the budgetary planning for our research? May I ask my colleague, Mr. Wampler, that?

Mr. WAMPLER. I would respond to the gentleman by saying that he would have great input in it, but I think it would still be the function of the Secretary and OMB. There would be tremendous input.

Mr. BEDELL. That is one of the great frustrations I have as a new member.

It seems to me we have an Office of Management and Budget, with very little expertise in these areas, who are making the decisions on actual policy in regard to what is going to be done. We are by-passing those people who have the better expertise and knowledge in regard to what can be done.

If the Office of Management and Budget wants to set guidelines in this sort of thing, then I feel pretty comfortable, but I was terribly uncomfortable with the fact that OMB is making so many of these policy decisions. These are detailed decisions on which I believe they are not the ones best qualified to make them.

Do you share the concern?

Dr. ANDERSON. Yes, we share it. In fact, we made an effort to get the folks out from the Office of Management and Budget to the real world of agriculture to see what is going on.

We had one in Mississippi for 2 days last week.

Mr. BEDELL. Good for you.

Mr. WAMPLER. If the gentleman would yield, I would point out this. On page 8 of the bill, it provides among other things, that no later than January 1 of each year a policy committee shall submit a report of its activity during the preceding fiscal year to the House Committee on Agriculture and the House Committee on Appropriations, the Senate Committee on Agriculture and Forestry, and the Senate Committee on Appropriations.

We would like to know what their recommendations are, and what action has become part of the budget. Perhaps we can be more effective that way.

Mr. BEDELL. I take it one of the purposes in this bill is to help get better input with the expertise and knowledge that is available?

Mr. WAMPLER. That is correct. Yes, that is exactly right.

The CHAIRMAN. Mr. McHugh?

Mr. MCUGH. Like the other members of the committee, I would like to congratulate this panel for its testimony. I think it is very well balanced. It is certainly an education to me.

Mr. Hightower's question on extension touched upon what was running through my mind.

Dr. Abraham, you spoke about extension.

It seemed to me you had a specific proposal in mind and related it back to Dr. Anderson's testimony about funding for the existing research programs.

You indicated that for extension there should be some phased-in funding beyond what we have now.

I am not sure about the germaneness of funding for extension under this bill, but I would like to see a little more clearly what your proposal was, if you have a specific one to make.

Dr. ABRAHAM. Congressman, I did not have a specific figure in mind. The extension directors similarly have a concern as to whether or not extension should be included in this bill.

Nevertheless, they do wish to lay before the committee, as it considers the bill, the point-of-view that, if we are to be in a position to carry out the information to people who can use it—which has been our traditional assignment—then as this body of research grows we will need to have additional funding.

If I may speak to the existing programs, I would say this. What I was thinking about there was that any funding that would come for the purpose of expanding upon the capability of the extension service along with the research work—it should be carried out through the existing mechanisms under the Smith-Leever authorizations that already exist, the same kind of system for extension as in the case of the state experiment stations. We work through the systems.

Presently, in a very short time, the representatives of the extension directors will speak to the budget matters and legislative matters, and will be appearing before the committees to point to their needs for the State extension service for fiscal year 1977.

They have experienced some of the same kinds of problems with OMB. Their targets have been set up for 1977. These would be along about the same dimensions as the experiment stations in terms of about \$48 million, or something of that order, for fiscal 1977.

Part of this was restoration because of erosion through inflation. Beyond that, there is some additional need that can be well taken care of if additional funds could be made available.

Mr. McHUGH. Thank you very much.

I yield back the balance of my time.

The CHAIRMAN. Chancellor Aldrich and gentlemen, we are very happy to have had your testimony today.

I join with Mr. Wampler in saying that this has been a distinguished panel and one that has been particularly informative.

I think your statements will certainly have an impact on the decisions of the committee.

Mr. Wampler?

Mr. WAMPLER. I have one additional question.

Dr. Abraham, I appreciate your testimony and I want you to understand that this bill is designed primarily to once again establish the mission of the Department of Agriculture—that is, one of the missions that is being involved in the field of research.

I am not unmindful of the function of the extension and education, because one without the other is somewhat meaningless. I think many

of our witnesses this morning have attested to that fact. I believe that very strongly.

Like many members of the committee and many members of the Congress, we are concerned when we examine the President's proposed budget for fiscal year 1977 and we see among other things a recommended reduction in appropriations for extension service. I think it is somewhere in the magnitude of \$10 million.

As I understand it, if that is effected, then it will mean that extension will suffer greatly and particularly in many desirable fields of nutritional education.

As you know, our committee now has taken a rather comprehensive study of the food stamp program, and the lack of proper nutritional education is an important facet of their study.

I wonder if you could comment briefly on what effect this \$10 million cut would have on extension activities, particularly as it relates to nutritional education?

Dr. ABRAHAM. Yes, I am mindful, and the directors are mindful of your views with respect to how extension relates to the particular bill at hand. We understand that.

With respect to the proposed reduction in the preparations for the expanded food and nutrition program, it would appear that, if we just took it on a straight dollar reduction, then it is about a 20 percent cut. Actually, it will probably be somewhat heavier than that, if one takes into account the inflationary aspects which have taken place, or do take place in the immediate future.

It will reduce our capability of reaching people who many times have to be reached through a 1-to-1 relationship.

These are people who we find are rather typically not participating in group kinds of activities. So it takes a little extra effort on the part of people who can work with them locally, right in their own communities to get their attention and to work with them on nutrition education.

So we view the proposed reduction in the extension appropriation as reducing the nutrition education program by at least 20 percent and perhaps more.

On the other hand, if I take Minnesota as an example, we have never been funded even at the peak of a few years ago at a level that would enable us to carry our program into more than 30 of the 87 counties in the State. So there are areas of the State that we have not been able to reach with this program. I am confident that other states have similar circumstances.

The funds are apportioned on a formula basis depending upon the proportions of low-income people in the respective states. But we could use additional funding without additional administrative expense because of people who can supervise this and they are in place.

Mr. WAMPLER. I thank you for your response.

I, of course, do not speak for the committee. I can only speak for myself. To the extent that I can influence the committee, I hope that in our recommendations to the Budget Committee, as part of the budget process, we will recommend the restoration of that cut. I understand the problems that OMB has in this and other areas. I am not insensitive to that. I know it is a complex job that they have to perform.

But, apparently in recommending this cut of \$10 million, they did address themselves to some cost ineffectiveness of some of our nutritional programs.

I know, in the Commonwealth of Virginia, our evidence there would certainly refute some of the conclusions that apparently OMB is coming up with as it relates to nutritional education in extension programs which are on-line and in place. It does not necessitate the creation of another bureaucracy. We can simply utilize that which is there.

I have one final question, Mr. Chairman, if I may.

I would address this to Dr. Anderson.

Dr. Anderson, as I recall from your testimony, you suggest that we have a full-time Assistant Secretary of Agriculture for Research and Education. I gather by that you would want this Assistant Secretary to have jurisdiction over both research and extension. Is that correct?

Dr. ANDERSON. That is correct.

I view research and extension together. This is what made the land-grant system what it is. I am just reinforcing what Dr. Abraham and others have said.

Mr. WAMPLER. I do not quarrel with your feeling of emphasis, but I just wonder whether or not we ought to include the extension under this. That is something that the committee will have to wrestle with.

I appreciate your testimony. I wanted to be sure of that particular point.

Again I want to thank all of you for your testimony.

The CHAIRMAN. Mr. Bedell?

Mr. BEDELL. A very short question of Dr. Abraham.

When the administration was before us yesterday, they indicated that, in the nutritional education program, they were directing it toward the low-income people. At least, I had the impression that they felt we were getting to the low-income people.

I take it in Minnesota, even with present funding, you feel that you cannot get to the low-income people and it depends upon where they live. You are not now getting to all of the low-income people with adequate nutritional education, as you see it.

Is that correct?

Dr. ABRAHAM. That is correct.

The CHAIRMAN. Gentlemen, again we appreciate your testimony.

The committee will stand in recess until 2 p.m. this afternoon.

[Whereupon, at 11:45 a.m. the hearing was recessed.]

AFTERNOON SESSION

The CHAIRMAN. The Committee on Agriculture will resume.

We are meeting this afternoon for further hearings in regard to H.R. 11743, introduced by Mr. Wampler and others, on the National Agricultural Research Policy Act and related legislation.

The Chair recognizes the gentleman from New York, Mr. Richmond.

Mr. RICHMOND. Thank you, Mr. Chairman.

It is a pleasure to introduce Dr. Barry Commoner, the director of the Center for the Biology of Natural Systems at Washington University in St. Louis.

Dr. Commoner is one of the foremost environmentalists in the United States.

He is a great author. He has written a book entitled "The Closing Circle." *The New Yorker* is now serializing his latest book entitled "The Poverty of Power," which I think every member of this committee ought to read at one time or another.

I have passed around articles by Dr. Commoner in the past.

Let me just say that it is an honor and a pleasure to have him with us and to listen to his testimony.

The CHAIRMAN. Dr. Commoner, would you please come forward?

We are happy that you can join us. I am sure the members of the committee are delighted to have the opportunity to hear your comments on this legislation.

STATEMENT OF DR. BARRY COMMONER, DIRECTOR, CENTER FOR BIOLOGY OF NATURAL SYSTEMS, WASHINGTON UNIVERSITY, ST. LOUIS, MO.

Dr. COMMONER. I have no written statement, Mr. Chairman. I prefer to extemporize.

I am really glad to be here because I think the task that you have undertaken is enormously important not only for agriculture, but for the development of the scientific competence of the country.

I think it is an undertaking which is extremely timely. The reason I think so is that it is clear that agriculture is heading into a new situation. The context in which agriculture works has been changing very rapidly in only the last few years.

I think it is very encouraging that your Committee has recognized that the purpose of research is to prepare us for the future.

When an essential part of our productive enterprise, such as agriculture, is clearly heading into a new type of situation with new kinds of problems, then it becomes urgent that you take a new look at the research support for that endeavor. You must deal first with bringing the research activity in tune with the needs of the future.

So I think it is a very encouraging thing to see that you are looking at what you might call the scientific crystal ball, which is really what research is about. It prepares us to deal with problems before they submerge us with their difficulties.

What I would like to do is to suggest some new approaches to your bill. I have read it. I think in many ways it is very germane to the problem. However, I think there are some aspects of it which need to be given further consideration.

I am no legislative expert so I have no phraseology to offer you. I would like to suggest that it needs to be broadened in its approach to research.

The main burden of my testimony is to tell you why I think so.

First, let me say what I think the new situation is into which agriculture is heading. Agriculture was once a marvelous example of a self-renewed, self-contained, productive enterprise. For a long time agriculture depended upon itself. The farmer was self-reliant and independent. The farmer, given soil, adequate labor, water and sun, could produce food and fiber. Very few external inputs were required.

In fact, we relied upon the farm as a kind of autonomous sector of the production system on which the rest of society was supported. It really was an exporter.

There is a fundamental thing that every farmer knows: If you have a system of production and if you are going to grow corn, you have got to renew the capability of that system continually. So if you grow corn, you cannot consume it all and some of it has to go back to seed. Of course, this is the fundamental idea of recycling.

The point I am making is this: Fundamentally, agriculture is a cyclical process. That is why it can be autonomous.

The only thing that agriculture really needs from the outside in a fundamental way is energy. That is delivered by the sun. That is the basic primitive idea about agriculture.

What is happening in the United States, particularly since World War II, is that the autonomy of agriculture has been drastically reduced.

Agriculture has now become heavily dependent upon the industrial sector.

There are various statistics that I could mention. For example, the amount of energy required to produce a given bushel of corn or bale of cotton has gone up. This energy now comes in the form of fuel, electricity, LPG gas and so on.

The chemicals which are needed are now brought in. It used to be that chemicals were derived from the soil. Now they come from outside.

So agriculture has now become dependent, and very much so, on the rest of industry.

The problems which arise became dramatized during the energy crisis.

The Midwest needed propane to dry grain. It used to be dried by the sun while the ear was on the stock. Now, as you know, the harvesters take the grain off usually moist, and it has to be dried with propane gas.

During the energy crisis many farmers were in trouble because they could not find propane gas to dry their grain in time to avoid its rotting. When they were able to get propane gas, the price had been jacked sky-high.

There is an example of the way in which the dependence—in this case of the harvesting of corn—on industry is a threat to the ability of the farmer to continue to produce.

I want to talk about that kind of problem which I think has emerged in a very striking way.

I would like to use as an example one aspect of agriculture. It happens to be the one that I know most about. I am talking about the behavior of nitrogen.

In other words, I would like to briefly review what has happened to the way in which the nitrogen cycle operates in agriculture; why that has changed; and the way it has made the farm vulnerable to the impact of changes in the industrial sector of production; and why we need research to counteract those difficulties.

As you know, in nature there is a cycle in which nitrogen in the soil is broken down to inorganic form which is then taken up by the roots of the plant. The plant takes energy from the sun and synthesizes organic forms of nitrogen. It links the carbon of carbon dioxide up with the nitrogen and forms organic compounds with the nitrogen attached.

This is the fundamental act of the crop. It creates, if you like, and produces organic matter.

In the case of nitrogen, it raises organic matter from the inorganic form in which it is in the soil, nitrate, to protein.

As we know, this is absolutely essential.

There is a cycle which keeps going around. I will not go through the details, but the organic matter in the crop is taken up, let's say, by cattle, and the cattle grow on it. They produce waste, which is organic matter. That goes into the soil. The organic material becomes feed, if you like, for bacteria. It becomes incorporated into the humus. Further, bacteria, break it down and the nitrate goes up into the crop.

I want to make one fundamental point about that cycle which I think has been overlooked. That cycle which is essential to the nourishment of the crop will not operate unless energy is fed in.

In the natural system that energy is fed into it in the form of organic matter, which is the energy source for the bacteria that operate the cycle.

For example, the bacteria which breaks down the humus to release nitrate has to use energy to do it. That energy comes from organic matter in the soil.

In the same way, the plant itself has to do work in order to pull the nutrients in from the soil into the roots. That is a work-requiring process. Again, it is the organic matter that the plant has synthesized which does it.

So the crop is really a way of taking energy from the sun and driving the nutritional cycles that support the crop, animals, and so on.

Nitrogen fixation, which as you know is an extremely important aspect, operates the same way. There is nitrogen in the air, but it is useless. Biologically it is useless unless it is converted to organic material. That requires energy also.

The bacteria, for example, around the roots of the legume get that energy which they need from the organic matter which the plant has synthesized.

So agriculture is an energy-requiring process. You cannot drive the cycles on which it depends without having energy. In nature this is supplied by the sun.

This is the old-fashioned way of doing things. On an old-fashioned farm you had animal mixed in with the crops so that the manure was fed back into the soil. You had crop rotation so that you had legumes that would fix the nitrogen.

There was very little external input required except machinery and, of course, the energy to run the machinery.

That has all changed now.

For example, in Illinois, let's say, where you grow corn it is not grown on manure anymore. The nitrogen is supplied by anhydrous ammonia. Anhydrous ammonia is made from nitrogen in the air. It is made by using energy. The energy that is used is natural gas.

So, the dependence of crops on chemical inorganic nitrogen is a consequence of an energy-requiring process. In this case that process takes place at the ammonia factory rather than on the farm.

The energy comes from a non-renewable source, natural gas, instead of from the sun. The energy that the ammonia plant uses is in a form which is in severe competition with industry.

The petrochemical industry and the chemical industry generally uses ammonia just as the farm does.

When the farm depended on manure for its nitrogen, no one competed with the farmer for manure.

Therefore, I say this: I do not need to emphasize the importance in increasing production, but what it has done is to reduce the independence of the farmers' operation of the nitrogen cycle. It has made it dependent upon a non-renewable source of energy. It has linked the farm, through competition for this particular material, to the industrial sector.

This is an example of the new situation that the farm is in: The farmer now has to compete for anhydrous ammonia with the chemical industry; the farmer has to compete for propane with the chemical industry.

I might tell you that of all the propane used in the United States about two-thirds of it is equally divided between farm use and the petrochemical industry.

So the two main users of propane are the huge multibillion dollar petrochemical industry and the farmers of the country. They have to compete. They compete over ammonia, propane, and other fuels.

They also now compete with the plastics industry over the intermediate chemicals which are used to make pesticides.

So, for example, let's say ethylene can be used either to make plastic or it can be used to make a pesticide.

The petrochemical industry's interest in making plastics then has an economic effect on the production of pesticides which then affects the farmer.

What I am saying is this: one of the serious changes which has taken place has resulted in the farm becoming much more closely linked to economically powerful industries.

The first point that I would like to make about the research side of this is: This change has resulted in serious immediate problems to the farm.

The fact that this change was taking place was signaled outside of the area of agricultural research.

In other words, the first sensitivity of the scientific community to what was happening, aside from people reporting what the price of fertilizer was and so on, arose in a very peculiar place.

I know a great deal about how Illinois became aware of its dependence on anhydrous ammonia. I can tell you where it turned up. It turned up in the water supply of the city of Decatur, Ill. This was about 6 or 7 years ago.

The water supply in the spring reached a level of nitrate which exceeded the Public Health Service limit.

I make a very simple point. That was the first overt evidence that Illinois agriculture had a fertilizer problem. It turned up as a public health problem. The Health Commissioner wondered what to do about nitrate that exceeded the Public Health Service limit.

Our Center for Biology of Natural Systems at Washington University was interested in nitrate pollution. We became engaged in studying the pollution problem.

We very quickly realized that the water entering the water supply came from the Sangamon River. The Sangamon River drained a heavily tilled area of Illinois. There was a serious question as to whether the heavy use of fertilizer was contributing to the high nitrate levels.

For the last 5 years we have been conducting a rather extensive research program sponsored not by the Department of Agriculture but by the National Science Foundation.

The reason for that is that we are not an agricultural institution. Our resources come from places like NSF.

We went to them and pointed out that this was a serious social problem and that we wanted to look at it.

In the last 5 years what we have discovered is that this has a serious relationship to the heavy use of fertilizers.

The interesting thing about that is that we have done very detailed studies of the distribution of fertilizer in various parts of Illinois. That includes how it drains into the water as well as which farmers are using it excessively, for example, on economic grounds. Sometimes they use too much.

In other words, we did a very detailed study of the use of nitrogen fertilizer, which provided a base for any farmer who wanted to cut back on his operation.

For example, we did a study for the State of Illinois, based on our NSF work, which showed what the costs would be in yields and economic returns if a given farmer in a given sector of Illinois wanted to cut back somewhat on his use of nitrogen fertilizer.

The point I want to make is this: All of this was done from the point of view of a pollution question.

Two years ago, when we came up with this information, it turned out to be enormously valuable to the farmers who were troubled by the energy crisis.

As a result of the energy crisis, the price of anhydrous ammonia began to shoot up because the price of natural gas went up.

We had information which now enabled the farmers to make rational judgments about the use of fertilizer which had a very important bearing on their economic situation.

What this illustrates is the fact that what happens on the farm now impinges upon the environment and upon the economy of industry. If you look at these links, then you begin to discover information that is very essential for agriculture itself.

To carry that a little further, let me point out that two years ago we realized that the kind of analysis that we were doing related to the energy independence of agriculture. We then went back to NSF and proposed what I think is probably the first research grant of any size on the question of the impact of energy shortages and high prices on agricultural production.

We made the point that although agriculture uses only 3 or 4 percent of the energy in the country and it makes no sense to stint on that, the fact that the price of energy is going up and that there may be shortages could have a very serious effect on agricultural production.

For the last year or two we have been doing studies designed to find ways of relieving the impact of energy shortages and high prices on agricultural production.

This is a direct consequence of our interest in pollution questions.

Here again there is evidence of the kind of broadening out that I think is essential.

For example, the coordinator of our project is a physicist. Why? Because you need a physicist to figure out the energy links and how much energy goes into fertilizer, et cetera.

For example, we did a computation about 3 years ago on the relative amount of energy that goes into the production of cotton and nylon. One consequence is that the Cotton Council can now put ads on television pointing out to the interested citizen that when you buy a cotton garment you are saving the country energy as compared with a nylon garment.

There is a tag, and I may have one in my pocket here. It is now on certain garments, I think, in Bloomingdales. It points this out.

Yes, I do have one. Here is the tag.

It says, "Cotton can save energy in our environment."

The data behind this label was derived from studies that we made in our center, which is not an agricultural institution, but an interdisciplinary group involving physicists, chemists, economists, and so on. We were interested in this. We came up with information early on which is obviously important to enable agriculture to meet this new situation.

I might add that one of the ways we thought agriculture could become more independent of energy would be to use less fertilizer and pesticides.

As you may know, we are in the middle of an analysis of a certain group of farms in the Midwest which do not use fertilizer and pesticides. They are following organic farming principles. They are simply using manure. They are not using pesticides at all.

One of the discoveries that we have made in our first year's work, although still tentative, is very interesting. It is not surprising that they use only one-third of the amount of energy per bushel of product produced as the conventional farms which are right next door.

But what is perhaps very surprising is that the organic farmers make about the same amount of money per acre of crop planted as the conventional ones. In fact, their yields are only slightly less than that of the conventional farms.

In other words, here is an alternative way of going about producing food which relieves those farmers of dependence on what is happening in the petrochemical market.

Let me just say a little bit about the importance of relieving this link.

The petrochemical industry is not only competing for, let's say, ammonia and propane, but it can afford to allow the price to go up.

So, for example, the petrochemical industry is part of a vertically integrated industry. When the price of propane went up, the manufacturers of plastics did not care because they were subsidiaries usually of the petroleum companies which were selling the propane.

In other words, the fact that the propane was high priced suddenly was a pure bookkeeping transaction for the petrochemical industry, whereas for the farmer it meant in the course of a year the tripling of the price of this important element.

That is one important point. That is unfair competition, I think, between the petrochemical industry and the farmer for an input like propane.

Second, the economic power of the petrochemical industry is a lot bigger than the farmers' power. The average assets of the petrochemical company are up in the billions. The average asset of a farmer in the United States is probably \$100,000 or maybe a little bit more than that. I am talking about the present time.

So the farmer does not have the economic resources to stand a temporary rise in the price of his input whereas the petrochemical industry does.

Perhaps the most serious thing is this: It is a terrible irony. The petrochemical industry competes with the farmer for his products. So the petrochemical industry competes with the cotton farmer for manufacture of fibers. The detergent industry competes with the farmer for the sale of saponifiable fat. If you include timber in agriculture generally, plastics compete with that.

Incidentally, the petrochemical industry is able to underprice these things.

One reason why I think this new situation gives a farmer a lot of trouble is that he is suddenly in competition, both for the price of inputs and for the sale of product, with a very powerful competitor; namely, the petrochemical industry.

I think the farmer has got to be able to cope with that.

What does all this mean with respect to research? It seems to me that the basic thing that we have to realize is that research has to be broadened out. There has got to be a research base for agriculture which reaches outside of agriculture itself.

So, for example, I think it would be extremely important to beef up the section of the bill that deals with competitive research. I am talking about research which goes outside of agricultural institutions.

However, I notice in that section of the bill that all of the grants would have to be submitted through the Secretary of Agriculture and to a committee which would be set up as a new thing doing largely the same kind of thing that is already being done in the National Science Foundation.

One of the questions I would like to raise for you is whether it might be a much stronger position for agriculture as a whole if that section, the support of competitive research, were somehow integrated into the general research program of the country, especially through NSF.

I am no expert as to how that would be done, whether through transfer of funds or whether agricultural funds should be added to the NSF appropriation or whether your Committee ought to work with the NSF Appropriations Committee. I do not know. However, I do think integration at that point is extremely important because the non-agricultural aspects of science are an essential early-warning signal for the kinds of changes that I have been talking about.

I would emphasize that as something important which has to be looked at in the bill.

I think the USDA should be heavily encouraged to find ways of supporting non-agricultural institutions.

I can tell you frankly—and I do not think it is too much of a surprise—that our Center has tried for the last 3 years to obtain a grant from the Department of Agriculture. We came close but never got one.

Maybe it is because we did not understand the bureaucracy adequately, but the lines of communication between the USDA and non-agricultural research institutions are weak. We, at least, do not know how to follow those lines.

I might tell you, for example, that we proposed 3 years ago to the USDA a grant to study the relative energy dependence of cotton and synthetic fibers. A number of people in the Agricultural Research Service were interested in doing it, but funds were never found. The right channel was never found. I think that is unfortunate.

So I think one thing you should try to do is to try to find ways to encourage the USDA to improve its contacts with the general scientific community.

The last thing I want to say is this: You have to expect a problem here. The problem is going to be, to put it very simply, controversy.

The moment an outsider, like our own institution, comes into a well-established, scientific field, we are going to be stepping on other people's toes. That is to be expected.

For example, when we began to study water pollution due to heavy use of fertilizer, then naturally those people who were interested in the heavy use of fertilizer were not happy. The Fertilizer Institute was very unhappy with us. For a long time they would write editorials.

I think it took two editorials on the part of the American Chemical Society before the Fertilizer Institute had the sense to invite me to appear at one of their meetings where we could discuss this openly.

On the other hand, they have not learned their lesson. Now they are unhappy about the work we have done on organic farms. However, they have not come to us and said, "Look, that is what we think is wrong with what you have done. What is your answer?"

People know that science has a way of getting at the truth, but let me tell you how it happens. It does not happen because scientists are any more truthful or smarter than anybody else. The way we get at the truth is that we have a rule in science: You make the mistakes in public. It is called "publication." That is really what it is about.

You lay out what the data is; you lay out the conclusions. If you have made a mistake, it is clear to everybody. Then someone comes along and says, "Look, you have done it wrong." It is like a game of tennis—they bat the ball back to you.

We are engaged in doing this right now. A reviewer of our organic project said: "These numbers are not computed right." What the reviewer did not know is that we had rounded off the numbers because statistics told us that we should not carry it out too many decimal points.

So we are going to tell them that. Then we will let them answer one way or the other. We will argue back and forth.

In other words, whenever you are dealing with a new situation, there has got to be open controversy and open discussion of data and conclusions.

Unfortunately, in this case the Fertilizer Institute has been apparently complaining about our work, but they have never complained to me. They have never said to us: "Look, here is what is wrong. Why don't we talk this over?" They are not playing by the rules of the game.

I mention this to you frankly because if, as you should, you go into this new approach to agricultural research and broaden it out, then there is going to be controversy. There will be differences of opinion. That is always the case when you do not understand the situation well enough.

The solution is not to hide it. The solution is not to complain without bringing things out in the open. The solution to that kind of controversy is open discussion.

I would hope that the bill in some way would encourage that.

When there are differences of opinion, I hope they are discussed openly with data presented, conclusions defended, and so on.

Let me conclude by saying that I think the bill is a very good step forward because it is essential to prepare the way for what is going to happen in agriculture.

However, I would urge you to broaden it out so that the USDA can do more work in non-agricultural institutions and so that the funding operation and the general oversight of the program relates closely to other government agencies, particularly NSF, that have a very important role to play in this area.

Thank you.

The CHAIRMAN. Thank you, Dr. Commoner. We appreciate your statement.

Mr. Harkin, have you a question?

Mr. HARKIN. Thank you, Mr. Chairman. I thank you for recognizing me first because I have another committee meeting.

I did want to say, Dr. Commoner, that I appreciate your testimony. I appreciate your coming here today.

I always appreciate it when so-called outsiders take a look at the insiders and give what they consider to be their objective, or even subjective, analysis of what the insiders might be doing.

I have long felt that one of the problems in our society today is that we are becoming segmented into different groupings. We really do not get this overall view. We do not get an outside agency looking at another one.

We have our problems in Congress, for example, trying to reform it. Every time a suggestion is made to reform Congress they appoint Congressmen to do it. I do not think that will get the job done.

Let's go back again to the agricultural field.

While I may not entirely agree with all of your arguments, I do agree with some of them. I do think it is very healthy that your institute in St. Louis is doing what it is doing.

I think it is making farmers take a second look at which way they are headed in agriculture.

I have a couple of questions regarding organic farming. I had always considered organic farmers as those people with 12 acres of ground growing some cabbages and carrots. Finally I began to look around in my own state of Iowa and began to realize that there are more than just a few farmers in organic farming. They are farming lots of land using organic principles.

One lives not 10 miles from me. I did not know it until just lately. He is farming about 300 acres of land. He stopped using any chemicals about 5 years ago.

He has kept pretty good track of his data. It seems that his corn yields and soy bean yields are always higher than his neighbors'.

In fact, he uses less energy not only in the savings of petrochemicals, but he goes over his crops fewer times than do his neighbors with their chemicals.

So I have become very interested in that.

His name is Richard Thompson. You may have heard of him.

Dr. COMMONER. I think he is one of our farmers.

Your description is almost exactly like the average organic farmer of which we have 16 pairs in our study. I am pretty sure Thompson is one of them. We do not like to mention the names.

Mr. HARKIN. There is another one up in the northeast in Iowa who is farming over 700 acres. I have not seen that farm, although I have seen Mr. Thompson's farm.

Dr. COMMONER. The average size of the ones we have studied is around 400 acres.

Mr. HARKIN. My question is this: If we go to organic farming, you are talking about crop rotation. You have to rotate the crops.

In Iowa we grow corn and soy beans. If you are going to rotate your crops and go to a corn, oats, clover, beans, corn system, then what you are effectively doing is cutting the corn production by 25 percent.

I am wondering if we can afford in this country to cut our corn production back by 25 percent.

What does that say in terms of prices? What does it say about income to farmers and everything else? I wonder if your institute has examined that part of it.

Dr. COMMONER. I should say that our original intention was to answer a very limited question.

I guess it really relates to a point Mr. Butz made. He said that no farmer could make it without using fertilizers and pesticides. We thought there was no point in going any further in looking into this if that were true.

Obviously farmers have to make a living and have to produce food.

So our present intention is what you might call a micro-study. It simply looks at specific organic farms and compares them with neighbors which are otherwise identical who use conventional approaches.

What we have learned, however, I think can suggest ways of getting at the question that you are raising.

First, I do not think that corn production would have to be cut back that much if land that has been taken out of harvested crops were put back in.

Mr. HARKIN. No land has been taken out of harvesting. We are farming everything in Iowa.

Dr. COMMONER. I am not talking about Iowa, but I am talking about generally.

For example, in Missouri there is leeway by bringing in more pasture land. You would reclaim land that has been allowed to go back to brush and, in some cases, just rough pasture. That is one way.

The second approach is to ask about the end use of the corn. After all, corn is not an end product in itself.

This raises the entire question of the inputs to beef production, into which we have started to look.

I think, for example, the trend which is developing very rapidly toward getting away from heavy corn feeding of beef and using more pasture and, in fact, legumed hay and so on many relieve that.

But they way to get at that answer is to do a macro-study.

Mr. HARKIN. That is what I am talking about.

Dr. COMMONER. The kind of data we are getting would be the inputs into a macro-study of that sort.

In fact, Dr. Heady may be moving in this direction. Dr. Heady could take our data on the way in which the two types of farms grow different crops and then ask questions about what that transition would do, let's say, in the State of Iowa to total corn production.

Then data that we are getting and others are getting on the relative inputs of corn and other ways of raising beef could be fed into the study. You would end up with a picture of the impact on beef production.

I think this is the way things will have to go. I am just saying that that is the kind of research that ought to be done.

Mr. HARKIN. I wish that you would put in a request to NSF for that. I happen to serve on another committee which has jurisdiction over NSF. I would like to see that request made.

Dr. COMMONER. I believe they are thinking of it already.

Mr. HARKIN. As far as rotating crops, one farmer might go to organic farming and do quite well. But what is going to happen if you do it on a macro-scale? I think there may be some drastic shifts.

If you do go to a crop rotation system on a massive scale, the only way I think you can make sure that people have sufficient protein to eat and that farmers have a profit incentive is to have more cattle feeding, not less.

Dr. COMMONER. It could well be.

Mr. HARKIN. That is what you are going to come up with I think.

So the people who are crying about feeding so much of the grain to beef may come full cycle and say it is the best thing to do.

Dr. COMMONER. I absolutely agree with you.

In fact, there are a number of interesting projects which use the cattle as a way of harvesting corn, for example, while it stands. There is a man named Woodruff at the University of Missouri who is doing that.

I might say this: We are in a very early stage of this. One of the important things that we have been able to do is that we have called a conference which will be held in the middle of June. This is with the support of NSF. It is on alternative approaches to agriculture which would relieve the energy crunch.

We just now have gotten all of the papers in. We are going to have 45 excellent papers. Most of them will be from agricultural institutions.

It is very interesting to find this: Here we are a non-agricultural institution. We called the first conference on this problem. The agriculture people are coming.

Most of these are micro-studies. There are a few papers that do deal with the macro-system that you are talking about in a tentative way.

I think what will come out of this conference will be a picture of how to get at the question which you are raising. I would hope that new research projects would develop from this.

Mr. HARKIN. I have just one last question.

Have you done any examination of the use and benefit ratio of using urea in cattle feed as a cattle supplement in terms of providing the protein?

Dr. COMMONER. No, we have not gone into that.

The only thing we have done on cattle feeding is to look at the energy requirements of different techniques.

Mr. HARKIN. It is an interesting analysis.

I have seen some where they use urea. It is made the same way that you make nitrogen. It is basically the same process of fixation.

There is less energy used per unit of urea that goes directly to the animal, rather than using the nitrogen to go into the soil to grow the crop to then feed to the animal.

Dr. COMMONER. Exactly.

One of the things that is happening is the systems analysis of the distribution of energy while the whole science of thermodynamics is being applied to exactly that kind of problem.

I think people will begin to examine all of these alternatives from an energy point of view.

We are just at the very beginning of this. When you think back, it is only 2 years that most of us have been into this.

Here are 45 investigators who are ready to talk at this conference about what they have learned in 2 years. I think it is very encouraging.

Mr. HARKIN. In closing, let me say that I wholeheartedly support our land grant colleges and do not in any way wish to see their research grants cut down. I think they have done a remarkable job for agriculture.

However, I do agree that there ought to be some other funds going into the type of research that you are talking about, which perhaps the land grant colleges cannot do.

I am a little concerned about your wanting to put into this bill some type of funding toward your ends, which I think could be better met going through NSF where you would be free from the constraints which are inherent in the system as presently set up.

Dr. COMMONER. I do not want to get into the bureaucratic network here.

I noticed at the NSF hearings that there was a question about how important it was for NSF to do agricultural research. Could it not be done better under USDA?

I think it is very important that NSF support, no matter where it comes from because it all comes from the same source in the end, in projects that relate to agriculture should not be cut back because there is a new program being developed in USDA. I think that would be very unfortunate.

Obviously I have some self interest here, but I think I can be fairly objective. I have been known to bite the hand that feeds me.

I am saying that NSF has a great track record.

Mr. HARKIN. While I may support this bill and will support the continued funding of the land grant colleges, that does not mean that I would not favor your type of project. However, I think it might be better through NSF.

Dr. COMMONER. Your judgment is probably better than mine as to how to do it. As long as it gets done, I will be happy.

Mr. HARKIN. Thank you very much, Dr. Commoner.

Thank you, Mr. Chairman.

Mr. BROWN [acting chairman]. Mr. Wampler?

Mr. WAMPLER. Dr. Commoner, I regret I was called out during a portion of your testimony, but I do want to compliment you on the portion that I did hear. We appreciate your coming here to share your knowledge with us.

I am sure that you are aware that yesterday Dr. Wittwer from Michigan State was here to testify. As you know, he has interest in many of the same areas about which you have expressed concern.

I heard you giving us a very fine dissertation on nitrogen fixation and photosynthesis. This is an area in which he has had great interest and concern.

I think this offers great hope and opportunity for us to find some basic answers to things that we must find if we are to survive.

In drafting the bill it was our thought that we would not disturb the existing patterns and mechanisms for agricultural research. These go back to the Hatch Act and the Land Grant Act. They have worked basically very well.

However, section 7 of the bill, as you perhaps know, does provide for a new approach to the so-called competitive grant program. This is to permit those outside of the normal funding channels to come in on a competitive basis to make a presentation.

Hopefully, the Policy Committee which is established in the bill would have broad enough representation and broad enough constituency that they would recognize the need for the right type of research, which you mentioned here today.

You have made some excellent comments and suggestions as to the relevance of research.

Again, I hope you can appreciate the vast Federal bureaucracy where there is agricultural research going on in practically every agency that carries on any substantial research.

ERDA is certainly devoting a considerable amount of resources and efforts to try to answer some of the energy problems that you pose.

I want you to know that we appreciate your testimony. Most importantly, I appreciate what you are doing as an individual in making a greater public awareness of the concept of what we have to do if we are to survive—not only to feed and clothe ourselves, but to help the less fortunate nations of the world. I want you to know how much I appreciate what you are doing.

Dr. COMMONER. I appreciate the administrative problem which you raise.

One thing struck me as you were talking. One of the things we have learned to do is to collaborate with agricultural institutions.

For example, right now we are putting in a proposal jointly with the Soils Department of the University of Illinois Agricultural College. They set aside a certain amount of money.

That was divided up in such a way that it really had to tie in with agricultural projects.

Dr. Fred Welch at Illinois had a project which fitted in. He knew that we had certain analytical ability, which is very unusual using isotopes, that would do that job very well.

So we are working with him and bringing our competence to bear on what is very precisely an agricultural problem.

Perhaps some wording might be put into the bill to encourage joint projects between agricultural institutions and non-agricultural ones.

That is the only point I would make.

Mr. WAMPLER. Dr. Commoner, I do not mean to be facetious when I say this at all.

I happen to believe that there are a few individuals spread out over the country, including Washington University, who have a few brains. They are not all at Harvard University. So we want to utilize all of the facilities we have.

I do think you make a very fine point: Coordination is something that we need to follow so that we can, to the greatest extent possible, reduce needless duplication of effort and resources.

I thank you again.

Mr. BROWN. The Chair would like to point out that we have three additional witnesses. I will not compel each of you to take your 5 minutes. If you should see fit not to take them, you may yield them back.

Mr. BALDUS. I yield mine back.

Mr. BROWN. Mr. Richmond?

Mr. RICHMOND. I yield back my time.

Mr. BROWN. Mr. Weaver?

Mr. WEAVER. No questions.

Mr. BROWN. Mr. Krebs?

Mr. KREBS. No questions.

Mr. BROWN. Mr. Bedell?

Mr. BEDELL. No questions.

Mr. BROWN. Mr. McHugh?

Mr. MCHUGH. No questions.

Mr. BROWN. May I ask just a question or two?

I noted in the press a month or so ago that your institute had been temporarily disestablished and then reestablished. I am not interested in the internal workings of your institution. However, I would just like to inquire if there was any element of agricultural research politics involved in this. If you would not care to answer, I would not object.

Dr. COMMONER. I think the question that you ask is an important one. I will answer it with the information that is at my disposal.

The specific events go back to the fact that the Center at Washington University is almost entirely supported by outside funds. We get very little support from the University itself.

For a number of years I have had the impression that some of the financial support for the University is probably unhappy about the results that we have produced. There is nothing scandalous about that.

After all, the University is supported by people from Monsanto, Purina, Olin, and so on.

I think it is just a cold fact that if we produce data which indicate that fertilizers which Monsanto is producing are not necessary for the well-being of the farmer in Illinois or Iowa, if I were running Monsanto I would feel unhappy, too.

I myself have made the point that plastics lead to all kinds of environmental problems. My new book picks out Astroturf, which is a registered trademark of something something that Monsanto makes.

I picked that out as a prize example of a foolish thing to do. Grass is a lot better for outfielders and tight ends.

Astroturf was developed because the Astrodome was developed. That is where it gets its name. The Houston Astrodome had to be covered over, so there was no light to grow grass.

It is one of the peculiarities of the plastic industry that once they start producing something they have to keep the machines going or they go broke.

What they did was to put this stuff all over fields that have light and could grow grass perfectly well.

I say this simply because I consider it my responsibility as an individual scientist, and certainly the Center has worked this way. We have talked about problems that might cost Monsanto money.

So it has been my assumption that there are people who might have some financial interest in the University who are unhappy about what we do. That is the first objective point I can make.

The second is that there was no rational basis for the University deciding to abolish the Center one Friday evening with 10 days' notice. The fact that there was no rational basis is evident by the fact that the next Tuesday evening they changed their minds.

So I am faced with the fact that the University did something which was inexplicable to an institution which undoubtedly is making some of the University supporters unhappy.

Now I do not really object to this disagreement. The only thing I object to is the disagreement not being open.

If the University had any reason to object to anything that the Center was doing, it was its obligation to say so. Then we would talk about it.

The University has approved everything we have ever done. It never said there was anything wrong.

If any corporation that has an interest in the University—for example, the Fertilizer Institute, which I know is unhappy about what we are doing—feels that the University should not support us, let them say so openly. I am quite prepared to have it out with them.

I must say that was the week that was. What happened was not surprising. However, it is evident that we are in a situation of controversy. It is inevitable because we have been making mistakes in this country.

The fact that the country is polluted as much as it is is a tremendous mistake. We have to recognize that.

We have been doing things wrong. When those of us who try to say what is wrong speak up, people are going to be unhappy. I do not see anything wrong with that. What I do see wrong is the unwillingness to debate this thing out in the open.

I think that what happened at Washington University was a signal. If anyone wants to object to what we do, they are going to have to do it straight out in the open. Then we can correct their mistakes as well as their correcting ours.

Mr. BROWN. Thank you very much, Dr. Commoner.

I am sure you are aware that all of the members of the committee are very much interested in your testimony. We appreciate your being here today.

Our next witness is Dr. James Dollahon, chairman of the American Association of College Agriculture Administrators from the College of Agriculture at the University of Wisconsin at River Falls, Wis.

Mr. BALDUS. Mr. Chairman, inasmuch as Dr. Dollahon is from my part of Wisconsin, I would like to personally welcome him. I think he represents my kind of people.

Mr. BROWN. I am sorry. I was not aware of that. I would have extended you the privilege of introducing Dr. Dollahon.

STATEMENT OF JAMES C. DOLLAHON, CHAIRMAN, AMERICAN ASSOCIATION OF UNIVERSITY AGRICULTURAL ADMINISTRATORS

Dr. DOLLAHON. Chairman Foley and members of the Committee, my name is James C. Dollahon. I am appearing here today as Chairman of the American Association of University Agricultural Administrators. AAUAA is a comparatively new organization, having been formed in 1973. This association was developed to represent the 50 non-land grant, 4-year, State supported colleges and universities which offer baccalaureate degrees in the agricultural sciences and/or renewable natural resource management. In the fall of the 1975-76 academic year this group of colleges and universities had approximately 27,069 students enrolled in undergraduate programs and about 1,396 students enrolled in undergraduate programs. A survey of available statistics indicates that collectively 4,293 bachelor degrees and 403 graduate degrees were awarded during the 1974-75 academic year.

The number of faculty employed by AAUAA member and potential member institutions was 904 in the 1974-75 academic year, of which 870 or 96 percent held advanced degrees. A total of 602 or 66 percent had completed the doctorate degree. The member institutions are vitally concerned with the future of the agricultural industry and the importance of insuring an adequate supply of food and fiber for this nation. It is from this standpoint that, as Chairman of AAUAA, I wish to place on record some concerns relative to H.R. 11339, National Agricultural Research Policy Act of 1976.

First, AAUAA is fully aware of the fantastic contributions made by the land grant colleges and universities authorized under the "First Morrill Act" and the role of the state agricultural experiment station created under the "Hatch Act". To promote additional research so very necessary for the maintenance of the agricultural industry, AAUAA strongly endorses the concept of additional funding for this worthy cause.

One reservation I wish to bring to the attention of this committee is that, in our opinion, this proposed Act as written is restrictive legislation. The only provision noted whereby a non-land grant college or university might participate is under the proposed competitive grant program (Sec. 6). Considering past history and the proposed structure

of the 15 member National Agricultural Research Policy Committee, it appears highly unlikely that proposals from non-land grant colleges and universities would be considered. This observation is based upon previous personal experience as well as that of a number of AAUAA members who have attempted to secure contract or special project funds from the U.S. Department of Agriculture. From our vantage point the U.S.D.A., including the Agricultural Research Service and the Cooperative State Research Service, in conjunction with the National Association of State Colleges and Land Grant Universities and some of its individual members, have systematically and deliberately excluded the non-land grant colleges and universities from involvement in agricultural research. As structured no one on the proposed committee would represent the potentially important pool of talent available for research in AAUAA institutions.

The "First Morrill Act" and the "Hatch Act" were implemented during a period when most of the non-land grant colleges and universities were non-existent or in a stage of infancy. Granted, both Acts have been amended and upgraded through the ensuing years. Considering the vast changes which have transpired within the agricultural community it appears that a major change or reorganization in the present operating procedures is in order. A review of the present situation indicates that the Secretary of Agriculture has not followed through on a process of long range planning which was implemented by his office a number of years ago. An examination of the history and activities within U.S.D.A. reveals that the most recent activities of planning for agricultural research date back to 1966 when Assistant Secretary Niles Brady, in conjunction with his staff and the Land Grant Association, developed a 10 year plan for agricultural research.

Possibly I am incorrect, however the available records do not indicate that an attempt has been made to update or modernize this plan which is now in its eleventh year. With the dramatic changes which have transpired during the past decade it is inconceivable that a course of action generated in 1966 is germane for the agricultural industry in 1976.

Congressman Wampler in House bill 11339 has proposed a 15-member committee composed of members representing land grant universities, a number of Federal agencies, and farm organizations. The size and scope of this committee does not lend itself well to the solving of existing problems. As an alternative the following recommendations are provided. An advisory committee on Agricultural Education and Research would be created. This unit, chaired by the Secretary, would consist of nine members appointed by the Secretary, from the various segments of agricultural education and research along with selected citizen members as deemed appropriate to represent the agricultural industry. The committee would be charged with the responsibility of developing a long range plan (a 10-year duration is recommended) for agricultural education and research. Further, the plan would be reviewed and updated at intervals of five (5) years. In addition the committee would submit annually a report to the leaders of both Houses of Congress and the President. As a part of the report a summary of the individual committee member's views would be included.

The long range plan would provide Congress and the administration with a document for planning and for the purpose of making budgetary decisions. Further, the annual report would reflect the progress made in achieving the goals established and the necessary changes required to meet the rapidly changing demands within the field of agriculture.

The Agricultural Education and Research Advisory Committee would be used in an evaluating capacity relative to programs and policies concerning agricultural education and research. Input from other agencies and related groups could be obtained from the Federal Commission on Science and Technology. Liaison between the proposed committee and this commission would facilitate communication and coordination.

Since the passage of the First Morrill Act and the Hatch Act the responsibility for agricultural research has been assigned to the land grant colleges and universities. To fulfill an additional need a number of States have created from State resources other colleges and universities to provide education, public service, and a limited amount of research in the field of agriculture. The major thrust or objective of the non-land grant colleges and universities has been undergraduate education. During the past 10 to 15 years the scope of the agricultural programs in a number of these institutions has expanded to a point where many have developed graduate programs and with the extremely limited resources available are making significant contributions to all phases of the agricultural industry. Most of the progress made has been accomplished with little or no support from federal sources. The U.S. Office of Education and other federal agencies have assumed that the responsibility for the support of agricultural programs rests with U.S.D.A. and have not for the most part looked favorable upon requests for program support. On the other hand U.S.D.A. has not extended its realm of responsibility beyond the needs of the land grant colleges and universities. Due to a lack of understanding these non-land grant colleges and universities with agricultural programs have, through no fault of their own, been placed in a gray area and their full potential has not been developed.

At this point in time when many of the resources, which provided the means by which the United States became a world power, are rapidly dwindling a new and positive approach must be developed. One area where this country can excel is in the production of food and fiber. The eventual survival of this great nation may well rest upon the expansion of its ability to produce an abundance of food at a reasonable price. There is little doubt that the energy crisis will be solved. However, an adequate supply of energy alone will not likely provide the raw material in a sufficient supply to keep the industrial portion of our country in balance. As has been the case during times of crisis the nation will again turn to agriculture to provide the balance of payment.

Many of the non-land grant colleges and universities presently have human and physical resources which are not being used to their fullest extent. The majority of the faculty members are employed for 9 months of the year and could be moved into meaningful employment in research and public service activities during the period when they are not teaching if funds were available. In comparison to the potential return the investment would be minimal.

A model for the involvement of non-land grant agricultural faculty in research has been provided in my home state of Wisconsin. The state legislature four years ago recognized the potential which existed and provided a modest appropriation for cooperative research between the land grant campus located at Madison and the two non-land grant campuses located at Platteville and River Falls. To date a total of 20 cooperative research projects have been funded. The faculties and resources of three campuses are currently being used to conduct research and promote the cause of agriculture within the State of Wisconsin. In addition the cooperative aspect has expanded to areas other than research. The faculty members on the three campuses through a common bond have a better knowledge of the difficulties within the field of agriculture and collectively are working diligently toward solutions to many of the problems which presently exist.

Since a highly productive working model has been developed, I strongly recommend that you, as Members of Congress, give serious thought to the adoption of a similar model for this nation. Consider for a moment the vast potential in states such as California [with five non-land grant campuses], Louisiana [seven non-land grant campuses], Missouri [five non-land grant campuses], and Texas [nine non-land grant campuses]. What better way might be found to use some of the additional resources which may become available than to implement a program whereby all of the existing resources, human and physical, could be utilized effectively in providing those engaged in the production, processing and marketing of agricultural products with up to date and factual information?

As we proceed into the bicentennial year, let us seriously reconsider the goals and objectives of agricultural education and research. In charting a course of action to attain the goals established, and to fulfill the stated objectives, let us use all of the resources available in our great nation.

Mr. BROWN. Thank you very much, Dr. Dollahon. Your testimony is excellent.

I particularly appreciated your suggestion about the need for some sort of ongoing 5-year agricultural research plan which could be periodically updated.

I think you have called our attention to the importance of using those unused resources.

Mr. Baldus?

Mr. BALDUS. I would like defer to Mr. Wampler because I think the testimony refers to concerns that have been voiced before. I think Mr. Wampler has responded to them. I would like to have that review first.

Mr. BROWN. Mr. Wampler?

Mr. WAMPLER. I, too, want to express my appreciation, Dr. Dollahon, for coming here and sharing your views with us.

It certainly was not my intention to any way further restrict the opportunity for non-land grant institutions of higher learning to participate in basic agricultural research.

As a matter of fact, section 7 of the bill, which provides for the competitive grant program, is a new vehicle, legislatively speaking, which will hopefully make available the requested authorization for funding. Then those outside of the normal or historical funding chan-

nels, such as under the Morrill Act, the Hatch Act, and other formulas that have been developed in past years, would be able to participate.

We would hope that the non-land grant colleges and universities would avail themselves of Section 7 and make application for competitive grants.

In the composition of the Advisory Committee it was our feeling that it has a broad enough constituency that certainly the non-land grant universities would have input at that level.

I think we must recognize that historically the land grant universities have carried on the basic research in addition to the in-house research in the Department of Agriculture and other Federal agencies.

Outside of the Department of Agriculture there is a substantial amount of agricultural research now being carried on in 10, 12, or 15 government agencies.

The purpose of this bill is not to further restrict it. I think section 7 does make more of this research resources available on a competitive grant basis.

I would hope that they would be considered fairly. I certainly would hope there would be no prejudice on the part of the committee.

You indicated in your testimony that there was some prejudice, but that is not the intent of this bill.

Dr. DOLLAHON. May I comment on this?

Mr. BROWN. Certainly.

Dr. DOLLAHON. I feel that as the committee is structured there a provision has not been made for a non-land grant person to sit on this committee. It is composed primarily of people from the U.S. Department of Agriculture, from the land grant colleges, the farm organizations, and some of the Federal agencies.

We feel to gain at least some input into this type of a structure it would be necessary, if this type of a committee is developed, that someone representing the non-land grant colleges and universities with programs in the agricultural sciences should be involved in this committee.

For this reason: It is very, very frequent that some of the institutions which are members of AAUAA are involved with the USDA. They are involved in the grants and special project funding programs that they have. Many requests are made. Even to gain information it is sometimes difficult in that if you are not a land grant college or university, often the welcome you receive is rather poor.

I think this is one aspect of the situation which really has not come out at this point.

This was one reason for my stating that we feel that there is some problem with this approach.

Mr. WAMPLER. As you notice, Dr. Dollahon, there is a designated representative of the National Science Foundation.

I do not know if they are aware of the sensitivity of the problem that you raise, but perhaps that individual could have some input.

Dr. DOLLAHON. Perhaps you missed my earlier point.

Both the Federal agencies—the Department of Health, Education and Welfare, the National Science Foundation, and so forth—have been very reluctant to look at funding for programs in the agricultural sciences. They have looked to the U.S. Department of Agriculture to fund these types of programs.

When a non-land grant institution makes a request to a Federal agency, the chances of success are very, very low. One of the reasons frequently given is the fact that agriculture has money for research and should take care of its own.

When the non-land grant agricultural college goes to the USDA, their request frequently falls upon deaf ears. They are told that funds are not available for the kinds of projects and so forth that are suggested.

We are talking about someone who is treated very much like the stepchild at the family reunion or the adopted child at the family reunion. We probably could paraphrase it another way, but I think you get the point.

Here is a group that is sitting out here. To whom do they belong?

The USDA and land grant people are not interested in claiming them. The other Federal agencies tell them to turn to Agriculture for their support. In so doing, they cannot get this.

Then where in this whole structure, even though there is a representative on the committee from the National Science Foundation, can he go? The member on that committee would possibly not do any good.

Mr. WAMPLER. Let me ask a question for my own edification.

Does the American Association of College Agriculture Administrators include both land grant and non-land grant?

Dr. DOLLAHON. No, it does not.

The name there is wrong. It should be the American Association of University Agricultural Administrators.

Mr. WAMPLER. Is not the University of Wisconsin a land grant university?

Dr. DOLLAHON. The University of Wisconsin is a land grant university. However, the land grant campus is the Madison campus.

If you are acquainted with the law that set up the land grant system, one campus in each State—or two in some cases—is set up. Where the 1890 institutions are involved there are two land grant campuses in some states. However, one campus is designated as the land grant campus.

The dollars made available to the land grant colleges and universities go to the land grant campuses and that is it.

Mr. WAMPLER. But the University of Wisconsin does have that designation; is that correct?

Dr. DOLLAHON. The University of Wisconsin at Madison does.

We are a system composed of 13 4-year campuses and 18 2-year campuses. The Madison campus solely is the land grant campus in that system.

Mr. WAMPLER. You have one chancellor who has jurisdiction over all the system?

Dr. DOLLAHON. There is a president of the system and then there is a chancellor at each of the campuses.

Mr. BROWN. Mr. Baldus?

Mr. BALDUS. Mr. Chairman, the reason I deferred to Mr. Wampler was because of this:

Mr. Poage had a question similar to that. Then Mr. Wampler responded in a similar fashion.

I think there is a considerable body of concern about the same thing which concerns you. I think Mr. Wampler is also concerned.

I do not know just how to approach this. We could have further documentation. Many of the members would be interested in that exclusion which you mentioned. They would also be interested in broadening the use of resources we have to what many of us regard as the more practical level of pure research.

So I want to thank you for being here.

I would invite any further documentation and testimony you might have from your university or the other universities that you represent.

Do I assume from this that the American Association of University Agriculture Administrators has taken a position on this? In other words, they have formed this position and have this reservation and you are speaking for that group?

Dr. DOLLAHON. That is correct.

Mr. BALDUS. That is a significant point. I want to thank you for bringing it to us.

Mr. BROWN. Are there any further questions?

[No response.]

Mr. BROWN. Thank you very much, Dr. Dollahon. Thank you for being here.

Our next witness is Mr. Robert B. Delano, vice president of the American Farm Bureau Federation.

Mr. WAMPLER. Mr. Delano is here in his capacity as vice president of the American Farm Bureau Federation. I hasten to add that he is also president of the Virginia Farm Bureau Federation. He is a friend of mine for many years. I want to welcome him here today.

Mr. BROWN. I am certain that expresses the views of the entire committee.

I am pleased to know that you represent the Farm Bureau in the State of Virginia.

STATEMENT OF ROBERT B. DELANO, VICE PRESIDENT, AMERICAN FARM BUREAU FEDERATION

Mr. DELANO. Agricultural research in America has a proud and successful heritage. Two hundred years ago our colonial forebearers were fortunate if they could produce enough to feed their own families. Today an American farmer produces enough for himself and 55 other people. This compares favorably with a farm worker in Russia who produces enough for only seven others or a farm worker in France who produces enough for 14 others. Clearly, however, the great strides in American agriculture have not been taken accidentally. As a society we made decisions and set priorities which helped make this nation the great agricultural power it is today.

Publicly supported agricultural research in this country began over 100 years ago. Since then, our agricultural production has steadily increased as farmers and ranchers have adopted many technological advances developed by the cooperative efforts of the USDA and state agricultural experiment stations operated by the land grant colleges and universities. This successful combination of agricultural scientists working with farmers and ranchers has resulted in significant improvements in such areas as crop varieties, fertilizers, pesticides, animal breeding, and feeding.

Of course, these improvements benefit all citizens and not just the American farmer. Current Farm Bureau policy succinctly describes

the importance of this research as follows: "Adequate research is the basis for more efficient production and marketing; lower costs and new food; forest and fiber products. This leads to improved living for all Americans."

We cannot afford at this time to relax our efforts in agricultural research. Many new challenges confront modern agriculture which demand greatly expanded research efforts.

In the next 25 years the earth's population will expand by 2 to 3 billion people and increased demands for food and fiber will accompany this growth.

Currently only two areas, North America and Australia, are capable of consistent net exports of grain. Stated more dramatically, the U.S. accounts for 50 percent of the agricultural commodities moving in international markets.

To make matters even more difficult, it will no longer be possible for this country to meet growing demands by increasing planted acreage. Most of the good land in this country, and even some marginal land that was idled under government programs, has been brought back into production in recent years.

It is, therefore, evident that research will be the key to our ability to expand future production to meet growing domestic and foreign demand.

Farm Bureau policy presently lists a number of areas that we believe can benefit from further research. They include research to find: One, solutions to national energy problems; two, better solutions to agriculture's environmental concerns; three, acceptable controls for diseases and insects; four, new crop varieties with higher nutritional values and varieties suitable for mechanical handling and processing; five, cultural practices to improve soil and water conservation; six, solutions to marketing problems; seven, additional uses for agricultural byproducts; eight, improved productivity of crops in terms of yield per acre and nutritional value; and nine, improved techniques for the conversion of feed to livestock products.

Obviously, the importance of adequate agricultural research for the future has been well documented. Unfortunately, its importance is not reflected in current USDA expenditures. Total appropriations for agricultural research for the fiscal year 1976 are only \$478 million out of a total USDA budget of \$13.5 billion. This means that research accounts for only a little more than 3 percent of the total USDA budget. This does not appear to be an appropriate response to the challenges facing agricultural research which we have just discussed.

The trend indicated by a close look at USDA budget for the period 1969-1976 is very alarming. Congress has allowed traditional agricultural programs such as research to become secondary to domestic food programs. These programs, primarily the food stamp program, accounted for \$1 billion of the USDA budget in 1969 but jumped to \$9 billion in 1976. With well over one-half of the USDA budget now earmarked for domestic food programs, it is time for the Congress to reverse this trend and to start directing the USDA back to the problems of food and fiber production.

H.R. 11743, introduced by Congressman Wampler, would be a solid start toward the realignment of our priorities for Federal expenditures in agriculture. This bill would properly emphasize agricultural research

as a distinct mission of the USDA. It also would provide a workable mechanism for farm and industry organizations to join with representatives from government and the scientific community in establishing and reviewing national priorities and policies for agricultural research.

Most importantly, it would authorize much needed additional funding for agricultural research. As the USDA and the state agricultural experiment stations have demonstrated in the past, we can expect any monies invested in agricultural research to pay rewarding dividends.

We are particularly pleased with section 7 of the bill which would authorize the Secretary of Agriculture to make competitive grants available for food and agricultural research. We feel that the competitive grants will be a useful tool in efforts to obtain the best possible research.

We urge this Committee to move quickly and to favorably report H.R. 11743. In so doing, you will be taking a most important step toward reestablishing concern for food and fiber production as the top priority of the USDA.

Thank you, Mr. CHAIRMAN.

Mr. BROWN. Thank you very much.

Mr. Wampler?

Mr. WAMPLER. No questions.

Mr. BROWN. Mr. Baldus?

Mr. BALDUS. I have one short question.

Under competitive grant programs, where it says "research institutions, organizations, and individuals," I would presume that that means corporations would then become available under that.

Is that your understanding?

Mr. DELANO. I would defer to Mr. WAMPLER. I am not familiar with the details of the bill but only the general concept.

Mr. WAMPLER. I would say that section 7 of the bill says, "research institutions, organizations, and individuals for the purpose of carrying out agricultural and food research." Under that definition it could include corporations.

Mr. BALDUS. Thank you.

Mr. BROWN. Mr. Thornton?

Mr. THORNTON. Thank you, Mr. Chairman.

First, I would like to commend Mr. Delano for an outstanding statement and presentation.

I personally am of the view that the Department of Agriculture has done an outstanding job of disseminating scientific research results into the field. We may now be at a stage where the inventory of useful new scientific advances may be growing small.

Great attention then needs to be given not only to product-oriented research, but also to basic research, such as developing more efficient chlorophyll conversion of the sun's energy into food products.

Do you have any comment as to whether you think more basic research should properly be accented as well as the product-oriented research?

Mr. DELANO. This would always be appropriate.

Relative to energy, there are many areas here which are certainly needed.

Of course, I am conscious in my own state of the economic pressures on the financial resources of our state. We see them at times failing to appropriate enough money for cooperative research programs at our land grant university.

Mr. THORNTON. I am concerned that the very effectiveness of the agricultural research establishment and its dissemination into the field may have inhibited adequate funding attention to this very important effort in recent years.

In other words, the fact that we have been able to supply the nation's food and fiber with a small segment of our population may have lulled some parts of our nation into a sense of security. We must be sure that sense of security is not misplaced.

Mr. DELANO. I agree.

You may be saying that possibly our success has hurt us.

Mr. THORNTON. Rather, that we must make sure that our successes do not hurt us.

I thank you, Mr. Chairman.

Mr. BROWN. Thank you, Mr. Thorton.

Thank you, Mr. Delano, for your testimony.

Our last witness this afternoon is Mr. S. J. Richey. He is the Associate Dean of the College of Home Economics and Assistant Director of the Virginia Agricultural Experiment Station, Virginia Polytechnic Institute and State University, Blacksburg, Virginia.

Mr. WAMPLER. This is merely coincidental that we have so many Virginians here today.

I would seriously like to welcome Mr. Richey here. He is a man who has a vast reservoir of knowledge on the subject matter before us. He is a constituent of mine. I would certainly like to welcome him here today. I know the Committee will benefit from his testimony.

Mr. BROWN. I would say that if he is a constituent of yours, he is well aware of your leadership on this Committee and the services that you have rendered to agriculture.

We are happy to have him here today.

STATEMENT OF S. J. RICHEY, VIRGINIA POLYTECHNIC INSTITUTE, REPRESENTING THE AMERICAN HOME ECONOMICS ASSOCIATION, ASSOCIATION OF ADMINISTRATORS OF HOME ECONOMICS, AND NATIONAL COUNCIL OF ADMINISTRATORS OF HOME ECONOMICS

Mr. RICHEY. I appreciate the opportunity to appear before this Committee as a representative of the American Home Economics Association, the Association of Administrators of Home Economics, and the National Council of Administrators of Home Economics.

Agriculture research has traditionally included research on the well-being of rural families and the stability of families throughout our society. As research concerned with the production of food and fibers is a most important concern of this committee, we believe that research on the consumer aspects of agriculture, including the health and well-being of the American family, is equally important.

Our interpretation of the definition of agricultural research is that the consumer and family aspects are included in the Bankhead-Jones Act of 1935 and the Purnell Act of 1925.

Recognition of this part of total agricultural research is important and, in the viewpoint of the organizations I represent, should be explicit in the new legislation.

Agricultural research has included human nutrition work for many years. But the nutrition component has been severely limited in the past. Our knowledge about the nutritional requirements of the human is not nearly as clear as our understanding about the nutritional needs of our farm animals and household pets.

Participants at the conference "Research to Meet U.S. and World Food Needs," sponsored by the Agricultural Research Policy Advisory Committee and held in Kansas City in July 1975, ranked nutrient requirements of the human very high as a research need area.

The "World Food and Nutrition Study," a report of the Board on Agriculture and Renewable Resources of the National Academy of Sciences, recommended greatly increased support for research on nutrition and food science to determine the nutrient requirements, nutritional status, and food consumption patterns of people.

Research seems to have been most limited in the nutrition of normal people as contrasted to patients with various maladies.

Agricultural Experiment Stations and other institutions have the necessary core of expertise to accomplish the goal of human nutrition research. Much of this expertise is located in colleges and departments of home economics. But this small core requires additional support and additional researchers if progress is to be made in the near future.

We should recognize, too, that nutrition problems exist within the context of families who face a myriad of other difficulties. The disciplines within home economics have for many years attempted to provide assistance to individuals and families in their real environment. The assistance to families in solving nutrition problems must accompany the concerns for housing, clothing, transportation, personal goals—all of which are related to the economics of the family.

We support with enthusiasm the central focus of this legislation, the National Agricultural Policy Act of 1976.

Increased support of agricultural research programs is essential to the nation's well-being and to the individuals and families of this nation. Because sufficient funds to accomplish all research will likely never be available, we can support the concepts of coordination to achieve goals with minimum expenditures of funds and personnel.

We support further the idea of establishing priorities rather than attempting to work on a wide range of problems with no particular mission in mind.

The pending legislation proposes substantial grants to land grant colleges and universities and to State agricultural experiment stations for mission-oriented research. We are concerned that human nutrition and people-oriented research will be forgotten or given a very low priority, as it has in the past. We wish to suggest that this type of research be written into the legislation as a recognized mission of the agricultural research system.

The legislation proposes the establishment of a National Agricultural Research Policy Committee within the U.S. Department of Agriculture. Should this committee be comprised totally of production-oriented persons, the potential for excluding nutrition and family-oriented activities is considerably enhanced. We believe it is most

important that this committee have at least one representative with understanding and appreciation for human nutrition and people-oriented research. We wish to suggest that this need be recognized and incorporated into the legislation.

Aside from these concerns, the organizations I represent believe the National Agricultural Research Policy Act of 1976 has real merit and will further enhance the vital role of agricultural research.

I appreciate this opportunity to present these views and thank you for your consideration of our concerns and opinions.

Mr. BROWN. Thank you very much, Mr. Richey.

Mr. Wampler?

Mr. WAMPLER. Mr. Richey, I want to thank you for a very fine statement. I find myself almost in total agreement with what you have said.

It certainly was not my intent in drafting this bill to exclude or downgrade the essential functions which your organizations represent in terms of people-oriented research.

I might say that in the makeup of the Advisory Committee, as contemplated by the legislation before us, there is a provision in the bill for a representative from a national consumer organization.

I realize this is not what you were advocating or what you have suggested. However, it would be one, we trust, who would have a particular interest in these two areas that are suggested.

Also, it is my intention at the appropriate time to offer an amendment to the bill which would expand from one to four the representation from the Experiment Station Committee on Organization and Policy of the National Association of State Universities and Land Grant Colleges.

It could very well be that one of those four individuals would have the particular appreciation or expertise which you are concerned about.

Let me say that I think everyone on this Committee is deeply appreciative of what you and the organizations which you represent have done, what you are doing, and what we trust you will continue to do in the future.

It may very well be that while we cannot accomplish everything you want in the present bill before us, we hope, through the appropriation process perhaps, to give you the type of assistance that you need.

Also, there is a distinct possibility that additional legislation will be introduced which will give more emphasis to the programs that you are carrying out through a different funding formula. This could be different legislation or amending the existing law.

I have serious reservations as to whether or not this particular bill is the proper vehicle to try to accomplish what you have placed before us.

In the bill itself on page 4 it says,

Assistant Secretaries of Agriculture. The individual appointed pursuant to subsection [a] of this section shall coordinate all research, and disseminate all research information, relating to agriculture, food production, and nutrition conducted or financed by or affiliated with the United States Department of Agriculture.

The purpose of that language is abundantly clear—that they have the discretion and the authority to allocate some research dollars

in the field of nutrition. To me, that is absolutely essential if this bill is to achieve its purpose.

Mr. RICHEY. I appreciate that.

We do not have that copy of the bill before us.

Mr. WAMPLER. I might say that I think this is draft number three. Perhaps there will be other revisions.

We are fully aware of the contribution of nutrition and we certainly want to take care of it.

I thank you very much for coming. I also thank your associates who are with you. You have been very patient.

Mr. BROWN. Mr. Thornton?

Mr. THORTON. Thank you, Mr. Chairman.

I would like to share in the expressions just made by Mr. Wampler. It was a very outstanding presentation.

I have no questions.

Mr. BROWN. Thank you very much, Mr. Rickey, for your testimony.

This has given us an important input into our work. I am sure it will be given serious consideration by the Committee.

The committee will stand adjourned to meet at the call of the Chair.

[Whereupon, at 4 p.m., the hearing adjourned.]

[Additional statements and correspondence submitted to the committee follow:]

STATEMENT OF HON. JOHN F. SEIBERLING A REPRESENTATIVE IN CONGRESS FROM THE STATE OF OHIO

Mr. CHAIRMAN: The House Agriculture Committee should be commended for holding hearings on the need to expand and revitalize the nation's agricultural research programs. At a time when American agriculture is being called upon to feed more and more of the world's rapidly growing population, we must give higher priority to agricultural research efforts. As a sponsor of a bill—the Food Research and Development Act—which is similar to HR 11743 and which is also pending before the Committee, I appreciate the opportunity to submit testimony on this important legislation.

In recent years, federal funding for new food production techniques has lagged far below the level needed to keep pace with the worldwide demand for food. In 1955, 10.7 percent of the total USDA budget was allocated for research and development. That investment paid off handsomely both in terms of relatively low food prices for American consumers and a favorable balance of foreign trade. Since 1955, we have had a 50 percent increase in food production. Food experts now tell us that within the next 20 years, a 100 percent increase in world food production is needed. Yet only 3 percent of the USDA budget is being spent on research.

Perhaps more startling is the fact that of the total \$21.3 billion federal R. & D. budget request for fiscal 1977, agriculture accounts for only \$507 million, or about two percent while military R. & D. accounts for 11.2 billion—or 52 percent! This is certainly one of the great ironies of our misplaced national priorities.

Unfortunately, this same imbalance exists on a worldwide basis. According to Ruth Sivard, author of *World Military and Social Expenditures, 1976*, "military related R. & D. takes an estimated 25 percent of all the scientific manpower in the world and 40 percent of all R. & D. spending. Of the total public funds allocated to R. & D. in the European Community, approximately one-quarter is spent for military purposes. The proportion is higher in the two superpowers. The United States in the 1975 fiscal year spent 52 percent of publicly-funded R. & D. for military purposes and the proportion is estimated to be 50-60 percent in the Soviet Union."

In this same report, in a section on Nutrition, Ms. Sivard points out that with half a billion people suffering the ravages of severe malnutrition, foreign agricultural aid is about 1 percent of world military expenditures. The author then discusses what could be done with the \$15 billion a year which would be available if world military expenditures could be curtailed by just 5 percent. I think these alternatives would be interesting to this committee, and I would like to include this brief section at the conclusion of my remarks.

The state agriculture experiment stations, which conduct a major part of the Nation's agricultural research, are still operating at federal funding levels of a decade ago. The total scientist man-years at the stations has decreased by almost 200 since 1965. Moreover, the stations have had to decrease the number of scientist man-years on basic food research in order to devote more manpower to environmental quality and food safety research.

In addition to insufficient funding, the agricultural research programs have suffered from misguided research priorities, poor research management, and a low level of research quality in recent years. A 1972 study by the National Academy of Sciences noted these and other deficiencies in government funded agricultural research. The report faulted the government's research programs for failing to give greater priority to basic biochemical research—particularly in the areas of photosynthesis and nitrogen fixation—for lack of appropriate peer review procedures, and for insufficient use of competitive grants. Although the Department of Agriculture has restructured its research activities to some extent in response to the report, these criticisms are still valid.

I hope the Agriculture Committee will closely examine the organization and administration of the Department's research programs and adopt appropriate measures to correct the management problems which have stifled agricultural research in the past. In my opinion, the provisions of HR 11743 will do much to overcome these problems.

I also urge the Committee to set new guidelines and priorities for agricultural research efforts which recognize the limitations of our natural resources and which seek more efficient, renewable food sources for the future. Unfortunately, we cannot hope to meet the world's food needs simply by perfecting existing food production techniques or transferring our technology to agriculturally underdeveloped nations. To feed the people of India by using American food production methods would require more energy than that country now uses for all purposes. According to some experts, if all other nations adopted the protein-rich US diet and our heavy reliance on chemical fertilizers, pesticides, irrigation, and mechanization for food production, the world's present known fossil fuel reserves would be exhausted in 28 years—and this projection does not include the use of energy for food processing and transportation.

Increased use of vegetable and non-animal foods for human consumption and the development of more efficient methods of feeding livestock are necessary if we are to meet the food needs of the future. An estimated 40 percent of the average American diet is derived from animals. Such food is inefficient and expensive to produce. It takes up to 21 pounds of vegetable protein to produce just one pound of beef protein. The USDA has estimated that the manure from American livestock contains as much protein as the total US soybean crop.

Vegetable protein is far more efficient and economical to produce. An acre devoted to the production of cereals can produce five times more protein than an acre devoted to meat production. An acre devoted to legumes, such as peas and beans, can produce ten times more. Moreover, it takes about eight times less water to produce a diet based solely on vegetable protein than it does for a beef and vegetable-based diet. With water supplies for crop irrigation becoming a precious commodity in many areas, this is an important factor to be considered.

It is obvious that we must learn to depend on less wasteful sources of protein if we are to meet the world's future food needs. I hope the Agriculture Committee will take appropriate steps to insure that our agricultural research efforts are geared in this direction.

In the long run, however, the National Academy of Sciences has warned that "increases in agricultural output will depend largely on research results not yet in hand." A 1975 Academy report based on a 3-year study of US agricultural capabilities paints a very grim picture for the future unless we embark on the development of new food resources. According to the report, we cannot rely on expanded farmlands or increased fertilizer applications for meeting our future food needs—there are natural biological ceilings which will constrict food production based on current techniques.

It is thus essential that new, innovative food production techniques be given high priority in the nation's agricultural research effort, and I hope the Agriculture Committee will include appropriate guidelines for this purpose in the legislation it reports to the House. At the time I introduced the Food Research and Development Act in the 93rd Congress, I inserted a number of articles in the *Record* on a variety of new, more efficient food sources and techniques which have the potential for increasing food production levels several-fold. One article focused on a team of scientists at the University of Wisconsin who are attempting to utilize the protein in foodstuffs which are commonly discarded as waste—carrot tops, pea and potato vines, and plant vines. Another article dealt with research on a amazing microscopic plant which yields over 15,000 times as much protein per acre as wheat, produces a new crop every

four days, and has a higher protein value than milk, beef, or soybeans. Yet another article told of research on "single cell" protein produced from tiny micro-organisms nourished on old newspapers and cow manure.

Food products from discoveries like these would probably be unacceptable to the eating habits of the American people. But they could be used to replace the 200 million short tons of feed grains fed annually to livestock in the United States, freeing it for human consumption.

I appreciate the opportunity to submit this statement to the House Committee on Agriculture, and I commend the legislation to revitalize the agricultural research effort in this country. I hope that it will result in the adoption of effective legislation by the Congress to enable American agriculture to better respond to the world's growing food needs.

[EXCERPT OF ARTICLE BY RUTH SIVARD FROM WORLD MILITARY AND SOCIAL EXPENDITURES 1976]

Nutrition

The world food situation is more precarious than at any time since World War II. Whole nations are ravaged by hunger. The increase of food production has slowed down at a time when population in many countries is growing at an unprecedented rate. In the developing world, food production per capita has been on the decline during the 1970's.

Viewed against already existing deficiencies in food consumption, the worsening of the supply situation represents a hardship of alarming proportions for the poorest of the world's population. Excluding the centrally-planned economies of Asia, For which comparable data are lacking, at least 460 million people were believed to be suffering from severe protein-energy malnutrition in 1970, 30 million of them in developed countries, the remainder in the developing.

At mid-point in the decade of the 1970's, the number of severely malnourished is now much greater. Many of these are young children. Malnutrition, ranging from severe to milder forms, is believed to affect about half of all the young children in the developing world. Even with increased domestic production and commercial imports, the Food and Agriculture Organization of the United Nations estimates that in 10 years the number of severely malnourished people in the developing countries alone could reach 750 million.

Malnutrition plays a leading role in illness and mortality rates. In the Far East alone more than 100,000 children go blind each year as a result of Vitamin A deficiency. In Latin America, over half the deaths of children under five years of age are found to be due to nutritional deficiencies. In less direct ways, famine affects the progress of entire nations, weakening the population, stunting mental development, slowing productivity, breeding despair.

The provision of adequate nutrition on a world-wide basis is now a problem of such dimensions that it cannot be solved in the short term. There are, however, immediate measures that can be taken to meet emergency needs and to accelerate agricultural production. Some of these are included in the list on this page. While most of the requirements for action on the food deficit must be carried out by the countries themselves, external assistance from the industrialized countries is essential for the developing. The total of development aid specifically for agriculture rose from about \$2.5 billion in 1973 to \$3.5 billion in 1974. To achieve the longer term production increase in the developing countries which was proposed in the World Food Conference in 1974, additional external assistance of \$2.3 billion annually is believed to be needed. The amount is equivalent to about 1 per cent of the present military budgets of the developed countries.

Alternatives

If world military expenditures could be curtailed by 5 percent, the yearly saving would be

\$15.0 BILLION

What could \$15 billion do to reduce the world's vast social deficit? Here are some possibilities in the form of international cooperative programs for peaceful purposes, and their estimated annual costs. Each is a significant addition to existing programs. Together they would represent a start on a formidable fund for peace.

For 200 million malnourished children, supplementary protein feeding to insure full brain development.

\$4 BILLION

For poor countries on the edge of famine, increased agricultural investment to enlarge food production.

\$3 BILLION

Expansion of primary schools, with the addition of 100 million new places for children not now attending school.

\$3 BILLION

Emergency aid and a permanent international relief force to assist disaster-stricken countries.

\$2 BILLION

World-wide program for prevention of dental decay by fluoridation.

\$1.5 BILLION

Basic education for 25 million adults now illiterate.

\$1.0 BILLION

World-wide campaign to eradicate malaria.

\$450 MILLION

Iron supplement to protect 300 million children and women of childbearing ages against anemia.

\$45 MILLION

Vitamin supplement to protect 100 million children 1-5 years against blindness caused by Vitamin A deficiency.

STATEMENT OF HON. OLIN E. TEAGUE, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF TEXAS

MR. TEAGUE. Mr. Chairman, few questions before mankind over the next decade will rival in importance the question of whether we can avoid widespread food shortages and famine. The serious loss of life in several parts of the world in the last few years may come to be looked on as minor events if we do not take steps now to avoid much more catastrophic shortages between now and the year 2000.

To obtain an increase in food production we have basically only two courses of action. We can increase the acreage under cultivation and we can increase the yield which we get from each acre. The second course of action, the increase in yield, is the one which has been used in American agriculture with such outstanding success. Thanks to our agricultural research system we have for many years been able to bring the fruits of scientific research to bear on the needs of the American farmer. We have begun to help those in other lands to solve their own sometimes unique problems with food production.

Our agricultural research system is celebrating an important anniversary this year. It is just 100 years ago since the first agricultural experiment station was founded. Since that time we have expanded the number of agricultural experiment stations into every state of the union and we have built up the other components of the agricultural research system. The most important of these other components is the Agricultural Extension Service which serves as the link between the farmer and grower and the scientists in our universities. As a result we have today what is unquestionably the world's most advanced and productive cooperation between the laboratory and the farm:

Agricultural research has already brought untold benefits to every American. It covers food, fiber, and forestry. It covers the production, processing, packaging, transportation, storage, and distribution of agricultural products. Dedicated scientists in the Department of Agriculture, in American universities, and in the American food industry have tackled the many questions which had to be answered before the present level of abundance could be reached. But no system is perfect. In Special Oversight hearings held by a subcommittee of the Science and Technology Committee last year it became clear that the changing demands on our research community would also require that the research system itself undergo some adjustment and change. However, any such adjustment or change must in my view be done in a way which insures that those factors which have brought about the present success are not disrupted.

The bill before you would do just that. H.R. 11744 would make certain organizational changes in the way agricultural research is managed by the Department of Agriculture. I was pleased to join Congressman Wampler and a number of my other colleagues in cosponsoring this bill. I believe that it will further strengthen our agricultural research system for the benefit of the American people and, as a result, for the long-term benefit of people everywhere.

STATEMENT OF THE AMERICAN NATIONAL CATTLEMEN'S ASSOCIATION

Summary

The American National Cattlemen's Association [ANCA] is a non-profit corporation organized to carry out activities for the betterment of the cattle industry in the United States. ANCA is in its 79th year as national spokesman for the cattle industry, and represents, directly and indirectly, over 260,000 American cattlemen.

Federal funding of agricultural research [totaling \$384 million in fiscal 1974] needs to be increased to support additional research. Further, prior funding has not kept up with increasing costs due to new techniques and inflation. Research accounted for 10 percent of the USDA budget in 1955, it now accounts for 4.6 percent of the USDA budget.

The estimated spending for USDA programs in 1976 is about 3 percent of the total U.S. budget of \$349.4 billion. Of this relatively small USDA budget, 56 percent is destined for programs of the Food and Nutrition Service such as the Food Stamp Program, Food Donation Program, etc. If we are to provide abundant, wholesome, high quality food for these programs, and for the consuming public, we cannot continue to downgrade the research and development phases of agriculture.

Production costs are skyrocketing at the producer level. Cattle producers and feeders have been able to provide the consumer with a high quality wholesome product. To continue producing this quality product at an economical price to the consumer, new technology must be made available to improve efficiency and trim costs.

ANCA urges the Congress to support the "National Agricultural Research Policy Act of 1976." It is suggested that 40 percent of the research appropriations be allocated to appropriate Federal agencies and 60 percent to state agencies.

Statement

There is an increasing concern about the ability of agriculture in the U.S. and the rest of the world to increase food production rapidly enough to stay abreast of the population growth.

One objective in the U.S. must be to develop new technology, as well as land and other resources, in order to step up total output of grain and other crops to insure a food supply for years to come. In addition, we must seek maximum efficiency in the utilization of our crops. After all, a bushel of corn saved is equal to a bushel produced. This is why livestock producers keep emphasizing the importance of feed additives and other means of improving the efficiency of conversion of feed to food for human consumption. In view of world food needs, and in view of the energy shortage and previous inadequate research attention to range and forage production, it is imperative that we step up our funding of research related to forage breeding, production and utilization.

Economic research related to production systems and marketing programs is sorely needed by the beef cattle industry. Little attention has been given to this area of research in the past, but more sophisticated producers are aware of this void of knowledge and are requesting researchers to respond to it.

Beef cattle herd health is vital for efficient production, abundant food, improved human health and greater financial stability for the livestock industry. The estimated annual loss from animal diseases is \$3 billion, we believe effective research in animal health could markedly reduce this loss to the industry and greatly increase the supply of beef.

The role of agricultural products in meeting the trade balance that is so sorely needed cannot be over-emphasized. Agricultural commodities are one of the few items that can be used to reduce the trade deficit and give the U.S. a stronger position in world trade.

The past two years have been most unusual for the beef industry. Weather, price controls, boycotts, truck strikes, high production costs and a low market have placed the industry in a precarious position. The beef industry is now and will continue to be a vital component of the agricultural economy of the United States, with the end beneficiary being the American consumer.

In 1975 the per capita consumption of beef was 120 pounds. When compared to the 63.4 pounds per capita consumption in 1950 it is easily determined that a tremendous expansion has occurred. January 1, 1976 the U.S. beef cow herd was 43.7 million head, which is a dramatic increase from 33.5 million head ten years ago. Agriculture is basic to the economic welfare of America, and the cattle industry is the largest single segment of agriculture.

For the past two years, the Animal Health and Beef Cattle Research committees of the American National Cattlemen's Association has spent a great deal of time developing priorities of research with the production and animal health areas of the beef industry. ANCA sought and received the aid of many individual cattlemen from different areas of the country. Every one of the ANCA affiliated state cattlemen and state cattle feeders associations, along with the national breed affiliates, provided input and feedback in the development of these priorities. State and Federal personnel were fully cooperative in providing information desired.

We sincerely believe these research subjects, defined by producers and feeders according to economic priorities, do describe the more urgent needs of our industry. We believe that production and efficiency can be measurably influenced by new and practical technology and thereby provide adequate supplies of meat, a vital source of protein, at reasonable prices to the consumer. Statements have been made to the effect that cattle require up to 20 pounds of grain to produce one pound of beef. This is not true. A high ratio of corn is fed to cattle only when it is economically feasible to do so. The actual conversion rate is currently averaging less than 4 pounds of grain. Ruminant animals convert poor quality roughage into high quality protein by grazing most of their lives on 900 million acres of U.S. land which would otherwise be incapable of producing food.

Research monies spent in the next few years will have a profound affect upon the ability of the agricultural industry to supply the nutritional requirements of the United States in years to come. Attached are research priorities developed by the American National Cattlemen's Association, technology developed in these areas will have a significant affect toward reducing production costs.

[An attachment to the above statement is held in the committee file.]

STATEMENT OF NATIONAL MILK PRODUCERS FEDERATION

On behalf of our member dairy cooperative marketing associations and their dairy farmer members across the country, we appreciate the opportunity to offer testimony in wholehearted support of H.R. 11743.

American agriculture has been rightly termed one of the nation's great strengths. It has provided abundant, reasonably priced food and fiber for an expanding population despite the fact that an ever smaller portion of that population is actively engaged in its production. It has responded to the need for food supplies across the world.

The record of agriculture is one in which we can rightfully take great pride. But in doing so, we must carefully assess the factors that have made this possible.

Certainly, this nation is blessed with fertile soils and a range of climatic conditions which favor agricultural production. Our farmers have been aggressive and imaginative in their use of the resources available to them. Similarly, we have had the benefit of governmental policies, most of which have been formulated within this Committee, which have promoted a climate in which farm production and marketing can most effectively take place.

Aside from all of this, however, is the fact that we have consciously followed a policy of public investment in agricultural research and education that has sought to increase production and marketing efficiency, improve food quality, raise nutritional levels and generally add to the capabilities of American agriculture.

The improved technology and expanded knowledge available today is at the root of the production increases we have seen over the last several decades. The land we have available for agricultural production has basically the same characteristics and capacity. Through improved knowledge of conservation, fertilization and higher yielding plant varieties and animals, however, we have been able to make it produce more.

Improved technology in transportation, processing and packaging has made it possible to provide a continuing and stable supply of commodities to a nation of over 200 million people.

Our food system today is far different than it was in 1945. We credit these changes and advances to a thing vaguely termed "technology." In more concrete terms, these gains are the product of the greenhouses, the test plots, the laboratories and other agricultural research efforts.

But there is cause for concern. An expanding American and world population is placing increasing pressures on our agricultural capacity. Increasing costs for basic inputs pose difficult decisions for both producers and consumers. The need to maintain environmental quality in the face of demands for expanded production demands new technology.

These and other problems require an increased emphasis on agricultural research.

Unfortunately, just at the time that the need for new breakthroughs and significant advancements is growing, the resources available to the task are shrinking. In real terms, the investment in the development of new agricultural and food technology has declined in recent years. While there have been some increases in funding of research efforts, inflation has actually meant that less work is being accomplished.

Last year, the National Academy of Sciences, in a report entitled "Enhancement of Food Production for the United States," recognized this problem and recommended a renewed emphasis on research and development by the U.S. Department of Agriculture. Many of the recommendations of that study can be found in the provisions of H.R. 11743.

The dairy industry perhaps demonstrates the fruits of improved technology better than any segment of agriculture today. Milk is a highly perishable, bulky commodity. The problems of providing a constant flow of high quality milk and dairy products to the markets of the nation is a constant struggle for farmers, their cooperative marketing associations and other elements of the marketing system.

Not too many years ago we thought of the production area for fluid milk as the region immediately surrounding our cities where the greatest demand lay. It was not possible to maintain the quality of milk if it had to be moved any distance.

With the advent of improved sanitation on the farm and in milk plants, with improved transportation in terms of road nets and equipment, with advanced refrigeration methods, it is now possible to move fluid milk long distances while maintaining it at a uniformly high quality.

Last year, American dairy farmers produced 115.5 billion pounds of milk. If we look back 30 years, to 1945, we find that milk production totaled 119.8 billion pounds. But the differences which make up that production total are more startling than the four billion pound differential in the total.

In 1945, it took a national dairy cow herd of 25 million animals to produce the milk needed. Last year, slightly more than 11 million cows comprised the national dairy herd. In 1945, the average milk cow produced less than 4,800 pounds of milk. Last year, production per cow stood at 10,354 pounds of milk.

Improved management in the form of better nutrition, better housing, better equipment has made this possible. We know more about the genetics of dairy cattle. We are able to select breeding stock more accurately for their ability to improve the level of milk production.

But as far as we have come, there is a growing need to make further advances.

In the last few years, the dairy farmers of the nations have been faced with one of the most crushing cost-price squeezes ever encountered. At the same time, consumers of milk and dairy products have been hit with the same inflation that has been felt on the farm.

In an almost steady progression since World War II, the outlays for food, as a percentage of the take-home pay of the average worker in this country, has declined. Increasing wage rates have helped to make this possible. An even greater factor, however, has been the ability of the nation's farms and ranches to produce more efficiently and at less cost.

Suddenly, in the last few years, we have witnessed dramatic increases in food prices and the accompanying consumer concern. Without doubt, much, if not all, of this increase can be accounted for by increases in production and distribution costs. But to make that assessment and stop there is not enough.

What can be done to reduce production costs? What breakthroughs can be made that will reduce distribution costs of food as it moves from the farm to the consumer? How can we improve the quality of our food supply?

These questions must be answered if American agriculture is to continue to respond to the challenges being thrown at it in the form of an increasing population in this country and expanding demand from other nations around the world.

Last July, the U.S. Department of Agriculture convened a working conference to assess the research effort needed to permit American agriculture to meet U.S. and world food needs in the years ahead. Participation in the conference covered a broad spectrum, including scientists, political leaders, farm organizations, consumers, and others concerned with this problem.

A wide variety of issues were explored and a system of evaluation was developed to identify areas of critical importance in order to establish a priority of dealing with the many problems.

Such a conference is a necessary first step. Unfortunately, as we view the budget for USDA for Fiscal Year 1977, we find that little, if anything is recommended that would move toward implementation of these recommendations. While the budget for the Agricultural Research Service speaks of program increases in some areas, there will actually be a small decrease in total funding for the agency compared with budget requests for the current fiscal year.

Such increases as are planned are to be accomplished only at the expense of terminating or scaling back existing programs. In the case of dairy, the elimination of funding for the ARS work on the Dairy Sire Summary Program is an example of such proposed savings. The Sire Summary work has been the primary tool of research workers and geneticists in identifying superior herd sires. More than any other single factor, this has helped to more than double milk production per cow since 1945. It is work that benefits all dairy farmers by making available improved breeding stock through artificial breeding. It benefits the general public by increasing milk production per cow and thereby helping to hold down production costs.

But this \$1.5 million program is slated for elimination in the current budget in order to provide funds to undertake some additional research efforts or, more likely, to absorb increased research costs of the agency as a whole.

Following such an approach, we will not attain the goals of our agricultural policies.

As mentioned, the agricultural progress we are so proud of is based on technological advances. Such advances are not easily made. They are not readily apparent. They come only through years of investigation and research. They require a conscious investment in the future.

It is because H.R. 11743 represents a new commitment to this purpose that we support it. This legislation is needed to provide a new stimulus to the agricultural research efforts that have yielded such great benefit to the nation.

STATEMENT OF THE NATIONAL TURKEY FEDERATION

The National Turkey Federation is the only national trade association representing the interests of the turkey industry in the United States. The approximately 3,000 members of the National Turkey Federation include turkey producers, primary breeders, breeder flockowners, hatcherymen, processors, and marketers. Also included are allied members, who are non-producers, but who are dependent upon a viable turkey industry for the sale of goods and services.

The membership of the National Turkey Federation is responsible for the production and marketing of the major portion of the nation's turkey crop and is characterized by many producers whose sole income is derived from the production of turkeys.

The National Turkey Federation is in support of the concepts embodied in H.R. 11743, which provides for the establishment of a National Agricultural Research Policy Committee and for the appropriation of federal funds to greatly enlarge the total research effort for all of agriculture. Mr. Wampler, as well as other Members sponsoring this legislation, are to be commended for their interest, concern, and farsightedness in seeking to increase the production of food and fibre through the application of scientific technology which becomes available only through intensive research efforts.

Demand for turkeys has grown over the years. In 1890, only 10 million turkeys were raised in the United States. By 1935, 20 million turkeys were produced and annual per capita consumption was 1.7 pounds. Since 1953, the production of turkeys has shown a generally steady growth pattern. By 1955, production was 65 million; and by 1972, it had increased to 129 million, or 2,424 million pounds liveweight. Annual per capita consumption of turkey meat rose to an all-time high of 9.1 pounds in 1972.

There were 131 million turkeys raised in the United States in 1974, down one percent (1%) from 1973. This involved the production of 116 million heavy breeds and 15 million light breeds, for a total of 2,426 million pounds liveweight.

Gross income from turkeys in 1974 was \$680 million, compared with \$936 million in 1973.

Turkeys are raised in most regions of the United States. However, the top ten (10) turkey producing states in 1974 are as follows:

Minnesota, California, North Carolina, Missouri, Texas, Arkansas, Iowa, Indiana, Virginia, and Wisconsin.

The turkey is one of the most efficient of all meat producers. It will yield more meat per pound of feed in less time (especially more lean, body-building, high quality

protein meat) than almost any other domesticated animal. It takes only about three pounds of feed to produce one pound of turkey meat. In contrast, approximately eight pounds of feed are needed to produce a pound of gain in beef animals. At the same time, it must be recognized that the turkey is also very efficient from a meat-yield standpoint, averaging around eighty percent (80%) of its live weight.

As a result of the turkey's efficiency in converting feed grains to meat, turkey is available to the consumer at very economical prices in comparison with the cost of other meat food products. In addition to the economics involved, turkey is an excellent meat from a nutrition standpoint. Tests have shown the following:

1. The breast meat of turkey ranks higher in protein than cooked pork, lamb, beef, veal, or chicken. Also, turkey leg meat ranks higher in protein than any other cooked meat, except chicken breast.
2. Turkey meat is one of the very lowest of all meats in fat [caloric content].
3. Turkey meat is unusually rich in riboflavin and niacin.
4. The fat of turkey meat is unsaturated.

Over the past five years or so, there has been a significant decline in the number of scientific manhours devoted exclusively to research in turkeys. This decline in research inputs is not a reflection of lack of interest or the need for research on the turkey, but, rather, reflects the soaring costs of conducting agricultural research in today's economic climate. There are many problem areas in turkey production which demand immediate in-depth investigation. Such areas as:

1. Reproductive efficiency [egg production, fertility, hatchability].
2. Diseases [adenovirus, coliform, hemorrhagic enteritis, PPLO, etc.].
3. Nutrition [of growing birds, of breeder hens and toms].
4. Cause and prevention of leg weakness.
5. Processing plant condemnations.
6. Pollution of the environment [air, water].
7. Uses for turkey manure.
8. Further processing of turkey meat.

While the feed-to-meat efficiency of the turkey has already been mentioned, the general reproductive efficiency of the turkey is much less than that of other kinds of poultry. The turkey hen that begins her laying cycle in the spring will produce around ninety (90) eggs for the season. The hen that begins laying in the fall produces only forty-five (45) to fifty (50) eggs for the season. Averaging the seasons, turkey hens can be expected to average only slightly more than seventy (70) eggs during their laying period. In contrast, the chicken broiler breeder hen averages one hundred fifty (150) eggs. Only fifty-eight percent (58%) of turkey eggs placed in incubators hatch into poulets. Eight-five percent (85%) of chicken broiler breeder eggs hatch.

With turkey breeder hens producing only seventy (70) eggs per season, production cost of each egg is approximately 28 cents to 30 cents. Increasing the number of eggs per hen would result in a big reduction in cost per egg.

In 1972, for example, there were 3,519,000 turkey breeder hens in the United States producing 246,324,000 eggs. Only fifty-eight percent (58%) of these eggs hatched, producing 142,868,000 poulets. If percent hatch could be increased by only one percent (1%), from fifty-eight to fifty-nine percent (58%-59%), turkey hatching eggs needed would be reduced by more than 4,000,000, for savings of more than \$1,120,000. Increasing percent hatch by five percent (5%), from 58 to 63 percent (58%-63%), would result in savings of \$5,474,000, and a ten percent (10%) increase would produce savings of \$10,143,000.

Nine percent (9%) of all turkeys hatched die before reaching market age. Most of this mortality is directly traceable to a broad spectrum of diseases. Nine percent (9%) mortality in turkeys compares to only three percent (3%) mortality in chicken broilers. Mortality cost turkey producers more than \$15 million in 1972.

Turkey producers could be saved more than \$1.5 million if mortality could be reduced from nine percent (9%) to eight percent (8%). By reducing mortality five percent (5%), from nine to four percent (9%-4%), a saving of more than \$8 million would be realized.

By reducing mortality and starting the same number of poulets, more turkey could be produced for the consumers in this country, as well as for the export market. Reducing mortality from nine percent (9%) to eight percent (8%) would produce almost 29 million more pounds of live turkey, resulting in an increased gross farm income of nearly \$6 million. Reducing mortality from nine to four percent (9%-4%) would result in 134 million more pounds of live turkey and add nearly \$30 million to gross farm income (1972 as base).

There is still room for improvement in nutrition which will make the turkey even more efficient in converting feed to meat than it presently is. In 1972, turkeys consumed more than 7 billion pounds of feed. If feed efficiency could be increased from 3.0 pounds to 2.97 pounds, a one percent (1%) increase in efficiency, approximately 73 million pounds of feed could be saved and expenditures for feed reduced by about \$3.6 million. A five percent (5%) increase in efficiency would save 364 million pounds of feed and effect a cost savings of \$18.2 million.

The potential for side benefits from turkey disease research to other species has been dramatically illustrated by the development of a vaccine for the prevention of Marek's disease, a virus-related type of cancer affecting chickens. The vaccine, which is the first successful anti-cancer vaccine in any species, utilizes a non-pathogenic herpesvirus of turkeys, serologically related to the Marek's disease virus of chickens.

Marek's disease, once the most costly disease of domestic poultry, accounting for the loss of many millions of dollars annually, is now successively controlled by the new vaccine. The result is reduced costs of production for the poultryman and better food bargains in poultry meat and eggs for the buying public.

Serological data suggest that the non-pathogenic herpesvirus has probably been present in turkey populations for many years. Had more effort been directed toward turkey research, the virus might have been identified years earlier, making possible earlier development of the Marek's disease vaccine.

Turkeys are not naturally susceptible to tumor development when exposed to virulent Marek's disease virus. Turkeys and chickens may thus be used as animal models representing species naturally resistant and susceptible to tumor development when exposed to a known tumor-producing virus. Basic studies of the viremic and immunological responses of turkeys may yield clues to the basic mechanisms operative in resistance to virus-induced cancer.

Studies with cultured avian cells infected with herpesviruses from turkeys or chickens may reveal subtle changes at the sub-cellular level which may help to resolve some of the mysteries of tumor development and tumor resistance. Any breakthrough achieved in experimental systems with turkeys could be reflected in new or improved techniques for prevention, control, or treatment of human cancer.

Other areas in which turkeys might serve as useful animal models include mycotoxicosis, ornithosis, and Salmonellosis. Turkeys are naturally much more susceptible to illness produced by several of the naturally occurring mold toxins than are most other animals or man. Recent studies indicate that a laboratory test utilizing turkey organ cultures may be used to identify mycotoxins in foods and feeds before they reach our food chain.

Ornithosis is caused by an intracellular microorganism which is capable of causing severe or fatal pneumonia in turkeys, in certain other birds, and in man. Any information on such factors as manner of spread, methods of control or drug susceptibility which may be learned in research with turkeys will find application for human health as well.

Salmonellosis is a disease of man and animals caused by any of more than 1,000 serotypes of closely related bacteria. This is one of the areas of turkey health in which additional research is needed. Since all *Salmonella* must be considered as potential human pathogens, the research findings would be expected to be positive contributions to the field of human as well as poultry health.

In conclusion, there is no question as to the merit and need for a burgeoning increase in research across the broad scope of all of agriculture. Just recently, Secretary of Agriculture Butz appeared before the House Committee on Agriculture to discuss the condition of agriculture in general. When questioned about agricultural research by Congressman George Brown, the Secretary said, "We must increase it. We're faced during the next 25 years with feeding eighty percent [80 percent] more people, and there's no new Western Hemisphere to expand. Reflecting inflation, right now we're just about holding our own in supporting research."

It is possible the Secretary's comment about "holding our own in supporting research," may have been somewhat over-expansive. Particularly in view of the sharp decline in turkey research over the past five years or so.

UNIVERSITY OF KENTUCKY,
Lexington, Ky., February 11, 1976.

Hon. JOHN B. BRECKINRIDGE,
Congress of the United States,
House of Representatives, Washington, D.C.

Reference: House Bill 11339

DEAR CONGRESSMAN BRECKINRIDGE: The continuously increasing demand for food throughout the world, higher production costs and America's economic welfare and status in international trade made it imperative that greater emphasis and financial support be given to agricultural research. Perusal of House Bill No. 11339 [The Wampler Bill] reveals some positive action in this direction; however, the first draft of this bill contains some obvious limitations which should be revised if the desired purpose is to be attained.

Agricultural research must be placed in the forefront at all levels of the public and private sectors. An administrative officer in the USDA whose primary function would be to direct and promote research is needed. This administrative officer should be at a level of Assistant Secretary and a member of the Secretary's cabinet if research is to be a primary thrust of the Department of Agriculture.

The proposed National Agricultural Research Policy Committee could serve a vital function of focusing attention to agricultural research; however, representation identified in the first draft is not adequate. Representation of agencies actually involved in research, such as the State Experiment Stations, is needed, preferably from each of the four geographical regions that differ significantly in types of agriculture and production potential. Additional committee members representing farmers and farm organizations would also assure greater local and regional support of programs designed to accelerate agricultural research.

Increased federal support for agricultural research is absolutely essential and has the best potential of being the best investment this nation could make to enhance its future welfare and economic development. For maximum returns, this support should focus primarily on existing agricultural research agencies that have proven their capabilities and productivity.

The State Agricultural Experiment Stations and the USDA's Cooperative Research Service are doing an excellent job in coordinating agricultural research and, in our opinion, we have a minimum of duplication. Therefore, we strongly favor more funds for the state stations to assure adequate support, rather than initiating more research institutions, agencies and firms.

Federal allocations through the Hatch Act have proven to be a very successful method of funding research in the State Agricultural Experiment Stations at the Land-Grant Institutions. Federal grants made to support individual or specific research programs are often needed; but this method of funding, if allowed to become the primary route of research support, would make it almost impossible for our Colleges of Agriculture to develop and maintain highly competent teams of agricultural scientists.

Therefore, we believe that the primary method of increased support of agricultural research should be through allocations to the State Agricultural Experiment Stations, as by the Hatch Act. Agricultural research, if adequately funded in this manner, could be focused on state and regional, as well as national production and distribution problems. If the total output of food and cereal crops is to be increased in America, agricultural researchers must provide long-term solutions and technologies that will utilize available resources at the local level and contribute to a larger output per individual unit. The grant provisions in this proposed bill could be used very effectively as a source of research support for emergency situations that require immediate solutions.

I think The Wampler Bill will have greater support and its desired purposes will be attained if it is revised in line with these comments and suggestions.

Very truly yours,

CHARLES E. BARNHART.

NATIONAL ASSOCIATION OF WHEAT GROWERS,
Washington D.C., February 18, 1976.

Hon. THOMAS S. FOLEY,
Chairman, House Committee on Agriculture,
U.S. House of Representatives, Washington, D.C.

DEAR MR. CHAIRMAN: The National Association of Wheat Growers wishes to express its support for H.R. 11743, the proposed "National Agricultural Research Policy Act

of 1976." We feel that this legislation is long overdue, and that it would establish important changes which will improve research planning and make the overall agricultural research effort more effective.

The NAWG and its member organizations have a keen and essential interest in agricultural research policy and programs. Moreover, state wheat organizations dedicate significant sums annually to needed research and have attempted to work closely with state and USDA researchers in structuring programs and seeking necessary funding. Opportunities for input, however, have come too seldom, and they most often follow policy decisions and program development.

In particular, the NAWG has strong support for the establishment of a National Agricultural Research Policy Committee such as that proposed in H.R. 11743. In this regard, we are aware that an effort has been made to avoid establishment of a large, unwieldy committee, but we nevertheless object to the absence of commodity group representation. Commodity organizations, such as the NAWG, should not be forced to compete with "trade associations" and similar groups for representation. We therefore recommend that two representatives from commodity organizations be added to the advisors committee, and that they be given equal status to general farm and trade association representatives now provided for in the bill.

We appreciate your interest in our views, and we ask that our comments be made a part of the Committee's hearing record on H.R. 117543.

Sincerely,

JERRY REES,
Executive Vice President.

NATIONAL COTTON COUNCIL OF AMERICA,
Washington, D.C., February 12, 1976.

Hon. TOM FOLEY,
Chairman, Committee on Agriculture,
House of Representatives, Washington, D.C.

DEAR MR. CHAIRMAN: The National Cotton Council, which represents all seven segments of the raw cotton industry from grower to manufacturer, is vitally concerned with our nation's posture on agricultural research. Consequently, we are pleased to note that the House Committee on Agriculture will hold hearings February 17 and 18 on ways to increase agricultural research and its effectiveness. We support the effort and would greatly appreciate having this letter inserted in the hearing record.

Yield trends for most of the major U.S. crops have levelled off after many years of rapid rise. Since the need for food and fiber will continue to rise with population growth, and new agricultural land resources are limited, it seems essential that crop yields of the world's leading agricultural nation not be allowed to stagnate. This fact alone appears to justify much greater emphasis on agricultural research.

This, however, is not the only facet of agriculture that needs research attention. The increasing scarcity of petroleum and natural gas points to the need for more efficient use of these resources in agriculture, and for the substitution of renewable agricultural products for petroleum-derived products; i.e., natural fibers for synthetic fibers and crop residues as energy sources. Again, research is the key to meeting these needs.

We could fill many pages with specific research needs for cotton along that are not now being met adequately. Undoubtedly, other farm and commodity organizations could do the same in their areas of interest.

The concept embodied in H.R. 11743, by Mr. Wampler and others, is a very sound approach to stepping up agricultural research. It would involve not only representatives of agriculture and agricultural science, but also the non-agricultural scientific community and consumers, as well as in the development of agricultural research policy. We would like to see the National Agricultural Research Policy Committee envisioned in Mr. Wampler's bill enlarged somewhat to include representatives of home economics, forestry and the extension service.

We urge the House Committee on Agriculture to look with favor on the policy-making and funding concepts of H.R. 11743. This will complement the additional voluntary research funding by farmers and ranchers themselves now being sought through government-assisted uniform collection plans. Although the importance of agriculture to our nation and the world has not really changed, the public awareness of its importance has been raised quite substantially by the events of recent years. The time for public acceptance of stepped-up agricultural research could not be more propitious.

With appreciation,

Sincerely,

W. D. LAWSON III,
President.

**DEPARTMENT OF AGRICULTURE,
OFFICE OF THE SECRETARY,
Washington, D.C., May 5, 1976.**

Hon. THOMAS S. FOLEY,
*Chairman, Committee on Agriculture,
 House of Representatives,
 Washington, D.C.*

DEAR MR. CHAIRMAN: I am pleased to respond to your request of April 12 regarding the concerns of Dr. James Dollahon of the American Association of University Agricultural Administrators (AAUAA) expressed in his letter of March 8 to me.

I was among those present at the hearing on H.R. 11743 when Dr. Dollahon testified on behalf of the AAUAA. I introduced myself to him and indicated an interest in knowing more about that organization. In turn, he sent me the March 8 letter and enclosures.

The Department of Agriculture has several authorities for contracting or granting for research. Notable among one available to all of the research agencies of the Department are Basic Research Grants, September 6, 1958, and the Special Research Grants Act, P.L. 89-106. These authorities enable USDA to enter into contract or grant arrangements with a wide array of research organizations, including ones of the sort comprising the membership of the association represented by Dr. Dollahon.

I've made no survey, but I'm certain the number of grants to institutions in the AAUAA is very low. While the research capability at these institutions over the years has been a factor, it must be pointed out that in recent times there have been few USDA contracts or grants to any institutions. The inflationary squeeze has resulted in a marked reduction in such activities by the Agricultural Research Service, Economic Research Service and Forest Service.

Dr. Dollahon's reference to Acts limiting federally-funded research to certain institutions relates mostly to funds appropriated to the Cooperative State Research Service (CSRS). The Hatch Act of 1887, as Amended in 1955, P.L. 84-353, describes a Federal-State partnership with funds going under statutory formulas to State agricultural experiment stations which were authorized by State legislatures. These legislatures specified, in almost all instances, that the experiment station shall be a part of the Land-Grant University of the several States. The McIntire-Stennis Act, P.L. 87-788, provides that funds shall go to qualified forestry research organizations designated by governors. By an appropriation earmarking process, the greatest portion of the funds appropriated to CSRS under P.L. 89-106 are used to support research at the predominantly Black Colleges of 1890 and Tuskegee Institute.

Competitive grant funds for research provided to CSRS under P.L. 89-106 are described in full in the Federal Register each year after the CSRS appropriation has been approved. The purpose of that procedure is to make sure institutions with research capability have opportunity to compete for funds Congress makes available. The announcement includes explanation of earmarkings under which the funds have been justified. The report provided to me by Dr. Dollahon indicates a growing capacity among the "Non-land Grant 4-year State Supported Colleges and Universities" to compete for those funds.

It has been estimated that the USDA research agencies, the State agricultural experiment stations, cooperating forestry schools, and the predominantly Black Colleges of 1890 and Tuskegee Institute conduct about 95 percent of the Nation's publicly supported agricultural research. This "publicly supported agricultural research system," and the associated research delivery system (extension education in particular) has a long history of highly effective work. As the Nation moves in the years ahead to strengthen and expand its agricultural research effort—as it surely must to feed, clothe, and shelter our growing population—it will need to insure adequate support for the "system" as well as to draw upon the numerous additional organizations that can make valuable contributions.

Sincerely,

**DAVID J. WARD,
 Research Planning and Coordination,**

STATEMENT OF LEO K. BUSTAD, PROFESSOR OF PHYSIOLOGY AND DEAN, COLLEGE OF VETERINARY MEDICINE, WASHINGTON STATE UNIVERSITY, PULLMAN, WASH., AND GEORGE PADGETT, DIRECTOR OF RESEARCH AND DEVELOPMENT, WASHINGTON STATE UNIVERSITY

The capability of the world to produce food has a limit that we have not yet reached. We must expand our efforts to reach a maximal level of production in an effort to feed the human population of the world. One of the important factors that limits food production over much of the land mass of the world which is utilizable for grazing land and little else is livestock disease. It is estimated that the annual dollar loss from animal disease by the year 1980 will be approximately \$3.6 billion if present trends continue. This cost will be reflected in the price of meat, milk, eggs and fiber for human utilization. Therefore, it seems obvious that every effort must be made to gain sufficient knowledge to prevent and combat the diseases and pests that decrease livestock production.

In thinking about this problem, we recall that in the mid-1950's Dr. M. E. Ensminger, while chairman of the Animal Science Department at Washington State University, published a very timely bulletin entitled "Problems and Practices of American Cattleman." It was initiated by a forward-looking Research Committee of the American National Cattlemen's Association who in their wisdom thought it necessary to "pinpoint the nation's problems in the beef cattle industry and to map the industries future in research and education." Dr. Ensminger's publication was a compilation of a nationwide survey designed to fulfill the Research Committee's objectives.

Recently we reread this bulletin. Although almost 20 years have passed since the completion of this well done survey that succinctly defined the problems, we must confess that the same serious disease and parasite problems that plagued the industry at that time are still with us.

Some progress has been made, but there is little basis for pride. We still have pneumonia, calf scours, bloat, shipping fever, foot rot and many other "old" diseases along with some new ones. The relative importance of these "old" diseases may have changed but they're still taking a big toll that looms even larger now because of the increased value of each animal. It is not possible to document the financial losses caused by many of the more recently identified maladies. Among the new unexplained diseases we have the weak calf syndrome in the Northwest, and an assortment of disease entities many of which are probably viral-induced.

While there may not be a greater number of deaths associated with many of these diseases they do diminish production and efficiency of feed utilization causing very substantial losses which are not readily measured or reported.

We in Veterinary Medicine have been training, largely through support from the National Institutes of Health, young, competent faculty members and researchers who are now ready and eager to apply their sophisticated training and expertise to animal disease problems. The funds proposed in this legislation would allow us to attack disease problems at a scientific level never before possible in veterinary medicine.

Our young people are trained and we have sophisticated equipment (see attached list) available to attack and solve problems that have been perplexing researchers and farmers alike for decades. We are ready and eager for the challenges ahead.

Heretofore, our principal sources of money for animal research have been from the National Institutes of Health of HEW. This support was principally for comparative studies and were justified principally on application of the research to disease of people. Without detracting from the importance of this work and the necessity for its support, we have to admit it has done little toward answering many major disease and nutritional problems in meat animals. This proposed legislation on animal health research will make it possible for us to perform needed medical research on at least some of the problems listed below which my associates and I feel are very important and are ready to attack if support is forthcoming:

1. Effective means of controlling bovine respiratory diseases with the elucidation of the causative factors and interrelationships that precipitate this costly disease in cattle.
2. Evaluation of the immune response of cattle and swine to the proper use of vaccines.
3. The delineation of the importance of recognized disease agents and the isolation of new ones such as the reo-like virus and crono-like virus recently incriminated in calf diarrhea in order to effectively control calf diarrhea.
4. Development of information on the etiology and control of the "Weak Calf Syndrome."
5. Development of effective control methods for infectious bovine kerato-conjunctivitis (Pink Eye) in cattle.

6. Development of herd health approach to disease prevention and the use of profile testing and computer diagnosis.
7. Evaluation and control of Tansy Ragwort poisoning and other important toxic agents which cause significant losses in livestock including many of the farm chemicals.
8. Control of parasites by immunologic means.
9. Development of more resistant strains of food animals.
10. Develop reasonable and unexpensive means of therapy for squamous cell carcinoma of cattle (Loss of 20,500 carcasses in 1975 and parts of 120,000 additional carcasses).
11. Study methods of ameliorating the effects of bruising and injuries on condemnation of parts of carcasses (880,000 partial condemnations in 1975).
12. Study the inflammatory processes resulting in adhesions which caused the loss of parts of 780,000 carcasses in 1975.
13. Study the interaction of disease in domestic and wild animals and investigate the reservoirs of these disorders in nature.

MAJOR EQUIPMENT AVAILABLE

No.	Name	Value
1	Electron microscope	\$75,000
4	Preparative ultracentrifuges	104,000
2	Liquid scintillation counters	36,000
3	UV Spectrophotometers	30,000
2	Spectrophotofluorimeters	26,000
8	Chromatography column monitors	20,000
1	Gamma counter	16,900
14	Revco freezers	28,000
1	Gas chromatograph	20,000
10	CO ₂ incubators	45,000
Total		400,000

Plus numerous less costly items of equipment and complete clinical pathology, histopathology, and diagnostic laboratories.



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